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"MINNESOTA ARCHITECTS LOOK AT ARCHITECTURAL EDUCATION,"

**An Appraisal of Academic Training in Architecture
by Minnesota's Registered Architects**

**A Study Conducted in Cooperation with
the Minnesota Society of Architects
and the University of Minnesota School of Architecture**

by

**John E. Stecklein, Director •
Mary Corcoran and Richard H. Lindeman, Research Associates
Bureau of Institutional Research**

**Bureau of Institutional Research
University of Minnesota
Minneapolis, Minnesota**

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CHAPTER I

THE PRACTICING ARCHITECT AND THE PROFESSIONAL SCHOOL

All architects have a stake in the training of their future colleagues. As members of a profession, they are responsible for the continuing quality of architectural practice. As employers, they want men of high calibre as their assistants and associates. Both depend in no small measure on the policies and practices of the professional schools. While certain minimum requirements can be enforced through accrediting and licensing procedures, this is not enough for an advancing profession. The aim of good schools is not just to produce men who are adequate by today's standards, but men who will be architectural leaders of the future. To do this, schools must continually appraise what they are teaching in the light of both present and anticipated future developments in the architectural profession. Such appraisals are, of course, a prime responsibility of the faculty members, but the advice of their fellow practicing architects is much too important a resource to be overlooked in making them. Men not directly charged with teaching responsibilities may be more objective about educational programs, and if asked for their opinions as individuals, with no pressure to reach a consensus with others, may provide a range of practical and provocative ideas.

Realizing that Minnesota's practicing architects could make an unique contribution to architectural instruction, the Education and Registration Committee of the Minneapolis Chapter of the American Institute of Architects initiated a study of attitudes and opinions of practicing architects on educational policies and programs. The Minnesota Society of Architects and the University of Minnesota School of Architecture cooperated to support the study. The Bureau of Institutional Research of the University of Minnesota was asked to work with the Minneapolis Chapter committee in carrying out this research.

Why The Study?

The aim of this study as it was originally conceived included both a general evaluation of strengths and weaknesses in the University of Minnesota School of Architecture program and more specific appraisals of certain aspects of the program which have been a source of dissatisfaction to some former students. In actual conduct the study was of broader scope because, although the opinions of the Minnesota graduates were of special interest, all Minnesota architects were included in the group consulted. Each man was asked to

evaluate his own professional training, wherever acquired, in the following ways:

1. What were the relative strengths or weaknesses of the professional preparation provided by his own academic training?
2. To what extent did he feel he had achieved certain specific educational objectives of his architectural courses?
3. How important does he judge these objectives to be in architectural training?
4. What recommendations would he make for changes in certain aspects of architectural educational policies and practices?

As an adjunct to this study of educational matters, information was also sought regarding two related professional problems -- quality of registration examinations for licensed architects and violations of the rules of professional practice set up by the American Institute of Architects.

How Was Information Obtained?

A folded, eight-page questionnaire was designed to obtain opinions on the subjects outlined above, as well as information about the individual's architectural training and experience, from each registered architect in Minnesota. The advisory committee of the Minneapolis Chapter of the American Institute of Architects was especially helpful in determining the topics to be included in the study and the wording of the questionnaire as finally used (see Appendix A for a copy of the questionnaire).

Because the attitudes and opinions of architects practicing in Minnesota were of greatest interest for the purposes of this study, only those architects who resided in the upper midwest area were included in the group surveyed. Almost two-thirds (64 per cent) of the total 430 architects to whom questionnaires were sent resided in Minneapolis, St. Paul, or adjacent suburbs, while another sixth lived in Minnesota outside the Twin Cities area. The remaining group of 94 persons (22 per cent) resided in neighboring north central states.

A response of some type was received from 306 (71 per cent) of the total group surveyed. Three mail follow-ups (and telephone calls to those in the Twin Cities) were made to those not responding to the initial mail request. Through these follow-ups it was learned that eight men were deceased and that 20 did not wish to complete the form because of illness, retirement, or some other personal reason. Two men returned questionnaires unmarked because they objected in principle to a questionnaire study

but in general the respondents who made comments gave evidence of interest in the project and willingness to cooperate. Four returned questionnaires too late for tabulation. Although the 272 usable questionnaires returned represented responses from a substantial majority (63 per cent) of the group of active Minnesota architects surveyed, it is uncertain whether or not those not responding would hold different opinions on the educational and professional questions studied. The information presented in this report has therefore been presented as the opinions of the 272 architects who returned questionnaires. Where the terms "all architects" and "Minnesota architects" are used, the group returning usable questionnaires is meant.

What Information Was Obtained?

The source material for analysis consisted of each man's responses to a series of statements in which he was asked to appraise specific aspects of academic architectural programs with respect to certain criteria. For the most part, he was asked to make ratings in terms of the extent to which he thought particular educational objectives had been achieved. He was also asked to describe in his own words particular strengths and weaknesses of academic architectural training and to amplify his recommendations on certain points. Each response on the 272 usable questionnaires and the biographical data was coded and punched on Hollerith cards. Tabulations of responses were then made for the total group and for sub-groups, in terms of the college or university in which respondents received their training, and by date of Minnesota registration.

To provide a picture of the architects who contributed the evaluative ratings and comments on which this report is based, the experience and training of the individuals who responded to the questionnaire are first described in Chapter II. Following this preliminary group description, the findings of the study are presented in the three succeeding chapters:

1. Evaluations of certain aspects of architectural programs as preparation for professional work, including evaluations of specific courses (Chapter III).
2. Appraisals of the architects' own achievements in major courses in the light of what they consider important in architectural education (Chapter IV).
3. Opinions and recommendations on professional problems related to education -- registration examination and mandatory rules of practice (Chapter V).

In each of the sections concerned with architectural education the responses of the entire group are discussed first, then those of University of Minnesota trained architects in comparison with men trained elsewhere, and finally, the responses of architects of varying lengths of experience as indicated by the year in which they were registered as licensed architects.

A summary of the study plan and the opinions surveyed and of the recommendations offered for improvements in architectural education by these architects concludes this report.

CHAPTER II

THE RESPONDING ARCHITECTS: THEIR TRAINING AND EXPERIENCE

The architects who returned questionnaires were typical of the entire group to whom forms were sent, in terms of place of residence. About two-thirds (63 per cent) resided in the Twin Cities area. The rest were divided between those living in other parts of Minnesota (15 per cent) and the surrounding states (22 per cent).

Respondents described their positions in various ways, but usually indicated an association with an architectural firm. About half (48 per cent) held leadership positions in architectural firms, usually as owners, partners, or principals, while a fifth reported that they were members or associates of a firm, or were specialists in particular phases of work such as "design," "job captain," or "detailing" (see Table 1). Practicing architects who did not indicate associations with firms were somewhat fewer in number, and still smaller proportions stated that they were employed by non-architectural firms (6 per cent), were educators (3 per cent), or were retired (4 per cent).

The median age of the respondents was 45 years but very few were less than 30 years old. The largest proportion (37 per cent) were in their 30's. Sixty per cent of the men were under 50 while 19 per cent were 60 years of age or older. Half of the men had earned their highest degrees during the 1940's or 1950's and two-thirds of them since 1930 (see Table 2). More than 40 per cent had become registered architects in Minnesota during the 1950's, and less than 20 per cent prior to 1930.

Where Did They Get Their Degrees?

In this study of opinions about architectural education, as in most such studies, the type of education received and the colleges or universities attended by the respondents are particularly pertinent to the interpretation of their responses. Three sub-groups of the questionnaire respondents were, therefore, identified according to the institutions in which they earned degrees. The first and largest group of 115 respondents received all of their degrees at the University of Minnesota; a second group of 35 respondents earned degrees both at the University of Minnesota and another institution; a third group of 88 respondents received all degrees from other institutions. Proportionately, more than half of the 272 respondents had received one or more degrees at the University of Minnesota, including 42 per cent who completed all of their degree work at this institution and 13 per cent who had degrees from both Minnesota and another college or university. About one-third received all of their architectural education at other institutions and 11 per cent reported no academic degree.

Table 1: PRESENT POSITIONS OF RESPONDENTS BY SOURCE OF DEGREES

Positions	Source of Degree			No Degree	No Information	Total	
	All Degrees at U. of M.	Degrees at Both U. of M. & Else-where	All Degrees Else-where				
	No.	No.	No.			No.	Per Cent
	No.	No.	No.	No.	No.	No.	Cent
Firm Officers (Owner, partner, principal, officer)	57	19	48	4	1	129	48
Firm Members, Associates, & Specialists	32	7	11	6	--	56	20
Independent Practitioners	18	1	17	13	--	49	18
Architects in Non-Architectural Firms	7	3	4	2	--	16	6
Educators	--	4	4	--	--	8	3
Retired	1	--	4	3	4	12	4
No Response	--	1	--	1	--	2	1
TOTAL	115	35	88	29	5	272	100

Table 2: YEAR IN WHICH LAST EARNED DEGREE WAS CONFERRED ON RESPONDENTS BY SOURCE OF DEGREES

Year Degree Conferred	Source of Degree			No Degree	No Information	Total	
	All Degrees at U. of M.	Degrees at Both U. of M. & Else-where	All Degrees Else-where				
	No.	No.	No.			No.	Per Cent
	No.	No.	No.	No.	No.	No.	Cent
1900-09	--	--	3	--	--	3	1
1910-19	2	2	15	--	1	20	7
1920-29	14	4	15	--	--	33	12
1930-39	29	8	16	--	1	54	20
1940-49	40	15	31	--	--	86	32
1950-59	30	5	7	--	--	42	15
No Response	--	1	1	--	3	5	2
No Degree	--	--	--	29	--	29	11
TOTAL	115	35	88	29	5	272	100

Most often mentioned among the "other" institutions attended were Harvard University, the University of Illinois, and Massachusetts Institute of Technology at which 28, 23, and 17 men, respectively, had earned degrees. The entire list of 40 institutions mentioned by the respondents ranged -- in geographical spread and institutional character -- from the University of Washington to the Swedish Royal Academy of Arts, with private eastern universities and midwestern state universities the two predominant types.

Certain differences in the types of positions held and in the date and type of architectural degrees received by the three degree groups can be identified in Tables 1, 2, and 3. The Minnesota graduates were more often members, associates, or specialists in architectural firms than were the men with some or all of their training elsewhere. This difference in type of positions held was one of several indications that the Minnesota degree group included a larger proportion of younger and less experienced men than the other groups. Differences in the years in which the last degree was earned (Table 2) and in year of registration as licensed architects (Table 4) make this point evident. The Minnesota degree group was made up largely of men who completed their formal architectural education during the last 30 years while a notably larger proportion (38 per cent vs. 14 per cent) of the men who earned all degrees elsewhere did so prior to 1930. More than half (56 and 54 per cents, respectively) of the Minnesota group and the mixed group were registered as architects during the 1950's compared with slightly more than a third of those trained entirely elsewhere.

The kinds of degrees held also differed, depending upon the degree granting institution (see Table 3). Two out of three men who earned all degrees at the University of Minnesota held a Bachelor of Architecture degree only; men who earned degrees at other institutions were more apt to hold a Bachelor of Science or Bachelor of Engineering degree. The relatively small group of 35 men who held degrees at both the University of Minnesota and other institutions included 26 individuals who held a Master of Architecture degree as well as a bachelor's degree. Additional degree types were also reported: the Bachelor of Arts degree only by six per cent of the group, and both a Bachelor of Arts and a Bachelor of Architecture degree by five per cent. A rather sizeable minority (19 per cent of the total) reported no architectural degree, although several held degrees in fields other than architecture, including 11 who held master's degrees in other fields.

When Did They Register?

Because architects' opinions about architectural education might also vary because of differing amounts of architectural experience, information was gathered concerning the respondents' dates of registration as licensed architects (see Tables 4, 5, 6, and 7). The registration dates ranged from 1910 to 1959, with sharp decreases in the numbers registered during the decades prior to 1930.

Table 3: KINDS OF DEGREES HELD BY RESPONDENTS BY SOURCE OF DEGREES

Kinds of Degrees	Source of Degree					Total	
	All Degrees at U. of M.	Degrees at Both U. of M. & Else-where	All Degrees Else-where	No Degree	No Information		
	No.	No.	No.	No.	No.	No.	Per Cent
Bachelor of Architecture	75	--	16	--	1	92	34
Bachelor of Arts or Bachelor of Arts in Architecture	12	--	5	--	--	17	6
Bachelor of Arts and Bachelor of Architecture	6	4	4	--	--	14	5
Bachelor of Science or Bachelor of Engineering or Bachelor of Science in Architecture, or Bachelor of Architectural Engineering	16	--	39	--	1	56	21
Master of Architecture	2	26	11	--	--	39	14
Other	4	5	13	--	--	22*	8
No Degree	--	--	--	29	--	29	11
No Response	--	--	--	--	3	3	1
TOTAL	115	35	88	29	5	272	100

* Includes 11 individuals with master's degrees in fields other than architecture.

Table 4: YEAR IN WHICH RESPONDENTS WERE REGISTERED AS LICENSED ARCHITECTS BY SOURCE OF DEGREES

Year of Registration	Source of Degree					Total	
	All Degrees at U. of M.	Degrees at Both U. of M. & Elsewhere	All Degrees Elsewhere	No Degree	No Information		
	No.	No.	No.	No.	No.	No.	Per Cent
1910-19	--	--	5	1	--	6	2
1920-29	2	1	16	5	3	27	10
1930-39	20	10	16	1	2	57	21
1940-49	24	4	16	11	--	55	20
1950-59	64	19	32	2	--	117	43
Not Registered	2	1	1	--	--	4	2
No Information	3	--	2	1	--	6	2
TOTAL	115	35	88	29	5	272	100

Table 5: PRESENT POSITIONS OF RESPONDENTS BY YEAR OF REGISTRATION AS A LICENSED ARCHITECT

Positions	Year of Registration					Not Registered	No Information	Total	
	1910-19	1920-29	1930-39	1940-49	1950-59				
	No.	No.	No.	No.	No.	No.	No.	No.	Per Cent
Firm Officers (Owners, partner, principal, officer)	3	12	25	27	61	1	--	129	48
Firm Members, Associates, Specialists	1	1	5	10	34	2	3	56	20
Independent Practitioners	2	6	13	12	14	--	2	49	18
Architects in Non-Architectural Firms	--	1	8	3	3	--	1	16	6
Educators	--	--	2	2	3	1	--	8	3
Retired	--	7	3	1	1	--	--	12	4
No Response	--	--	1	--	1	--	--	2	1
TOTAL	6	27	57	55	117	4	6	272	100

The men registered in the 1950's and to a lesser extent those registered in the 1940's, were more apt to be associated with architectural firms than were men registered earlier. Independent practitioners, on the other hand, were more frequent among the men registered before 1950 than among those more recently registered (see Table 5).

The three years of experience required before registration, war service, and other career interruptions contributed to the spread in years in which the last degree had been earned by men who were registered in any of the time periods shown in Table 6. Nevertheless, the two dates were related and men registered in the 1950's were for the most part those who had earned degrees during the post-war period. Those registered in the 1940's, on the other hand, had usually completed their academic work before the war.

Table 6: YEAR IN WHICH THE LAST EARNED DEGREE WAS CONFERRED ON RESPONDENTS BY YEAR OF REGISTRATION

Year Degree Conferred	Year of Registration					Not Regis- tered	No Infor- mation	Total	
	1910- 19	1920- 29	1930- 39	1940- 49	1950- 59			No.	Per Cent
	No.	No.	No.	No.	No.	No.	No.		
1900-09	--	2	1	--	--	--	--	3	1
1910-19	5	9	2	1	1	--	2	20	7
1920-29	--	8	20	4	1	--	--	33	12
1930-39	--	1	23	23	6	--	1	54	20
1940-49	--	--	--	16	68	1	1	86	32
1950-59	--	--	--	--	38	3	1	42	15
No Response	--	2	2	--	1	--	--	5	2
No Degree	1	5	9	11	2	--	1	29	11
TOTAL	6	27	57	55	117	4	6	272	100

Differences in the types of degrees held by men registered in the different decades indicates certain time changes in architectural educational programs (see Table 7). The men who were more recently registered usually held Bachelor of Architecture degrees, while those registered before 1940 were more apt to hold one with a science or engineering emphasis if they held any architectural degree. The proportion of men who became registered architects without a degree in this field declined notably in the 1950's.

Table 7: KINDS OF DEGREES HELD BY RESPONDENTS BY YEAR OF REGISTRATION

Kinds of Degrees	Year of Registration					Not Registered	No Information	Total	
	1910-19	1920-29	1930-39	1940-49	1950-59				
	No.	No.	No.	No.	No.	No.	No.	No.	Per Cent
Bachelor of Architecture	1	1	11	19	58	--	2	92	34
Bachelor of Arts or Bachelor of Arts in Architecture	--	1	2	3	10	--	1	17	6
Bachelor of Arts and Bachelor of Architecture	--	--	4	2	6	2	--	14	5
Bachelor of Science or Bachelor of Engineering or Bachelor of Science in Architecture or Bachelor of Architectural Engineering	3	12	15	11	13	1	1	56	21
Master of Architecture	--	4	9	6	19	1	--	39	14
Other	1	2	6	3	9	--	1	22*	8
No Response	--	2	1	--	--	--	--	3	1
No Degree	1	5	9	11	2	--	1	29	11
TOTAL	6	27	57	55	117	4	6	272	100

*Includes 11 individuals with master's degrees in fields other than architecture.

What Kind of Work Do They Do?

Formal academic work is only part of an architect's training -- a fact which is recognized by the requirement of three years of experience before registration as an architect in Minnesota and other states. A comparison of the work done during the training period and after registration was made using data shown in Table 8, where the average percentages of time that the architects reported they spent on various types of work activities are shown for these two stages in the architects' careers. About two-thirds of the group gave this information for their architect-in-training period. As the average time distribution in Table 8 indicates, these men spent about half of their training time making working drawings, and about a fourth on design activities. Management activities such as client contact, business management, and supervision were also included in their training period but they accounted for much less time during this period than they did later in their careers. No notable differences were found in the architectural training activities of men educated in different institutions or of persons registered at different times.

Table 8: AVERAGE DISTRIBUTION OF TIME BY WORK ACTIVITY DURING ARCHITECT-IN-TRAINING PERIOD AND AS LICENSED ARCHITECT FOR ALL ARCHITECTS REPORTING

Activity	As Architect- in-Training	As Licensed Architect
	Average Per Cent of Time	Average Per Cent of Time
Design	25	23
Working Drawings	49	20
Specifications	7	10
Client Contact	6	18
Business Management	2	13
Supervision	9	13
Other	2	3
All Activities	100	100
Number of Architects Reporting	183	248
Percentage of Group Reporting	67	91

After registration, three kinds of activities predominated in the respondents' work: design (23 per cent), preparation of working drawings (20 per cent), and client contact (18 per cent). Supervisory responsibilities, business management activities, and the preparation of specifications occupied most of the balance of their time. These men had typically had experience in all of these activities as architects-in-training, but subsequently spent much less time preparing working drawings and more on client contacts, supervising others, and management activities.

The work emphasis after registration did not vary notably for the men who had received all of their education at the University of Minnesota and those trained entirely elsewhere, but did differ in terms of the length of experience of the men as indicated by their registration dates. As might be expected, the more experienced men spent a larger share of their time in business management activities while those more recently registered spent a larger share on design activities.

What Can Be Said in Summary?

The types of positions now held, the architectural educational backgrounds, and the length and types of architectural experience of the men who contributed their opinions and evaluations in this study of architectural education have been described in this section. Architects located in all of the larger cities and towns of the state, as well as a number from surrounding states who are licensed in Minnesota were included in the group surveyed; however, the majority were residents of the Twin Cities metropolitan area. Respondents were predominantly individuals in their thirties and early forties who were associated with architectural firms, but included some who were in independent practice, or employed by non-architectural firms or agents. Minnesota trained men and men registered in recent years were especially apt to be members of an architectural firm rather than independent practitioners. Minnesota men also predominated among the more recent graduates, and tended to hold Bachelor of Architecture degrees rather than architectural science or engineering degrees. The latter types of degrees were more often held by graduates of other institutions and by men who were registered before 1940.

The types of work done by the men educated in different types of institutions, either during their training or post-registration periods did not vary notably, but there were definite and logical differences related to length of experience. Men who had registered recently were apt to be more concerned with design activities than were individuals with longer experience; the latter assumed larger shares of management responsibilities and related duties.

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CHAPTER III

EVALUATIONS OF ACADEMIC TRAINING IN ARCHITECTURE

To accomplish the major purpose of this study -- the evaluation of architectural education as preparation for professional work -- each architect was asked to rate his own academic training, both in general and in terms of specific architecture courses. Brief statements about strengths and weaknesses of his background and suggestions for improvements in architectural education were sought to supplement the information provided by rating scales.

General Appraisals of Architectural Education

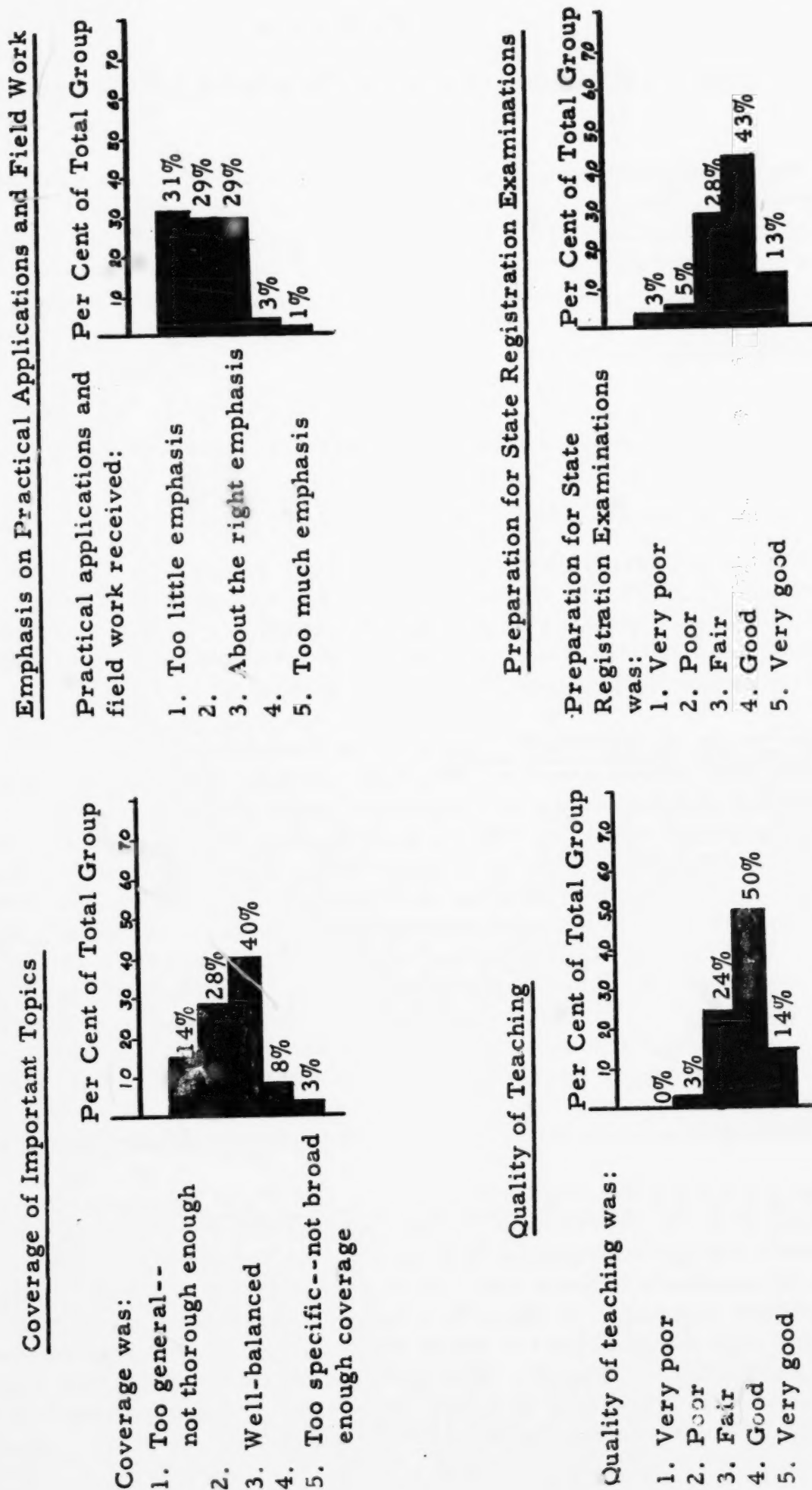
Professional Training in Architecture

The individuals in this study were asked to appraise their academic training in architecture in four ways: (1) thoroughness of coverage of important topics in courses; (2) relative emphasis on theory or practical applications and field work; (3) quality of teaching; and (4) adequacy of preparation for state registration examinations.

Coverage of Important Topics. -- Although 42 per cent of the architects felt that their professional architecture courses had been too general in coverage of important topics, an almost equal proportion (40 per cent) felt that their courses had provided a good balance between general and specific treatment of important topics (Figure 1A). The opinion that courses had been too general rather than too specific was expressed more often by the Minnesota-trained architects than by those trained elsewhere. Nearly half (48 per cent) of the Minnesota men regarded their courses as "too general" compared with less than 40 per cent of those trained elsewhere. Similarly, men registered in the 1940's were more inclined than the rest to criticize their course coverage as being too general. It should be noted at this point that, on the average, nearly a fifth of the individuals who had been licensed prior to 1940 declined to make the ratings requested. In comparison, usually only three to five per cent of the other registration groups provided no ratings.

Emphasis on Practical Applications and Field Work. -- Too little emphasis had been given to practical applications and field work in their professional programs compared with the emphasis put on theory according to 60 per cent of the respondents (Figure 1A). Less than one-third (29 per cent) thought that the relative emphasis on these two course aspects was about right and only four per cent thought that too much emphasis had been given to practical applications and field work. Minnesota graduates and the men registered as architects during the last 10 years were again the groups most inclined to criticize their academic training in this respect.

Figure 1A: APPRAISALS OF ACADEMIC TRAINING IN ARCHITECTURE
Ratings of Professional Program Emphases, Quality of Teaching and Preparation for Registration
Examinations by All Architects



Quality of Teaching. -- Most of the architects rated the quality of the teaching in their architectural programs as "good" or "very good;" only three per cent gave "poor" ratings (Figure 1A). Differences between the men graduated from Minnesota and other schools were negligible, but the men registered in earlier years did tend to give the more favorable appraisals.

Although most of the men had rated the quality of teaching in their architecture programs as good, many believed that some special training would improve the general quality of architectural education. In response to the question,

"Do you believe that teachers of architecture should have training designed to acquaint them generally with principles of learning, testing, and teaching methodology?"

50 per cent of the group said "Yes," 27 per cent were uncertain, and 16 per cent said "No." The remaining seven per cent gave no response to this question.

Typical of the comments made by those favoring such training were these:

"Of the instructors I knew in the Minnesota School of Architecture, there were only two whom I would classify as educators."

"A man may be a good designer, but if he lacks teaching ability, he is of little help to his students."

"Not all practicing architects on staff are good teachers."

"It is possible to be well-qualified to do a certain thing, but be poorly qualified to instruct others in the same skill."

"Teachers of architecture would be better able to 'put over' their material and to make it more interesting if they were trained in teaching methods."

Preparation for State Registration Examinations. -- Architectural programs were rated as "very good" or "good" as preparation for the state registration examinations by more than half (56 per cent) of the responding architects (Figure 1A). Only eight per cent rated them as "poor" or "very poor" in this respect. Opinions on this matter did not differ between the men trained at the University of Minnesota and those trained elsewhere, but those who had more recently prepared for the examinations, as indicated by their registration dates, were most inclined to rate their academic preparation favorably. Seventy-two per cent of the men registered in the 1950's said that their preparation for these examinations was "good" or "very good" compared with 47 per cent of those registered in the 1940's and 37 per cent of those registered prior to that time.

Provision for Cultural Background

A complete evaluation of a professional educational program should include some estimate of the adequacy of the cultural background afforded by that program. To obtain such information, the architects were asked to indicate the extent to which they felt they had acquired an adequate general cultural background through academic training. While only three per cent of the men rated their architectural school programs as "very poor" in this respect, "very good" ratings were also the exception (Figure 1B). The general impression was that the cultural background provided through academic programs was only "fair." Minnesota graduates were especially inclined to be critical of their training in this respect. Only 29 per cent said that the cultural background was "good" or "very good" compared with 49 per cent of the men who had degrees from other schools. The men who had registered before 1940 were generally most favorably impressed with the cultural aspects of their academic training, and those who had registered in the 1950's were least satisfied.

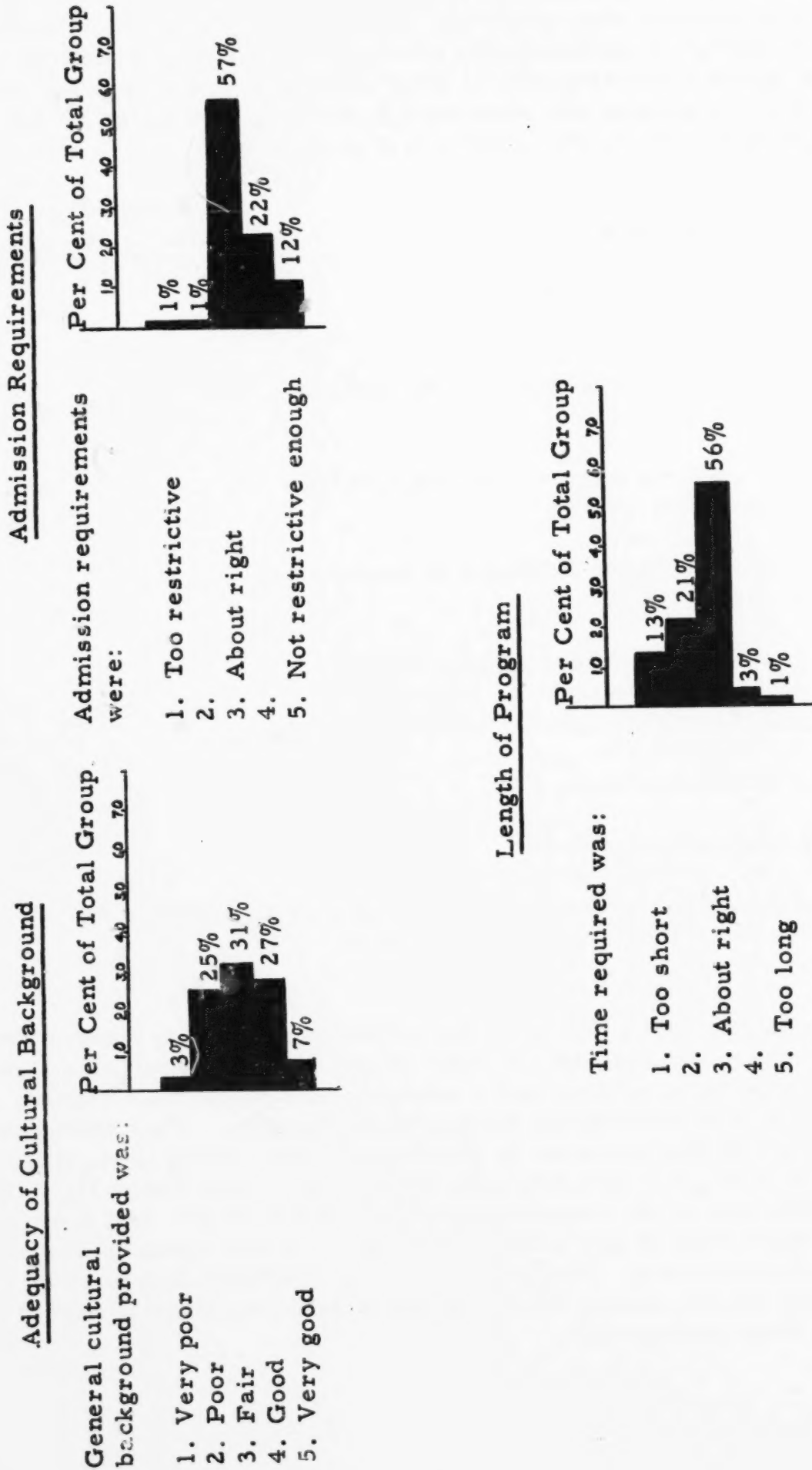
Program Requirements

In addition to the appraisals of cultural and professional preparation, the architects were asked to rate the admission policies and the time required for training by their architectural schools.

Admission Requirements. -- Although 57 per cent of the architects thought that the requirements for admission to schools of architecture were "about right," those who disagreed usually rated them as being "not restrictive enough" rather than "too restrictive" (Figure 1B). Men registered before 1940 were more inclined than the rest to believe that the admission requirements were "not restrictive enough" while those registered more recently regarded them as "about right." There was little difference between men who had degrees from Minnesota and from other institutions in ratings of admission requirements.

Length of Program. -- The time required to complete their professional architectural programs was also thought to have been "about right" by the majority of respondents (56 per cent), but those who differed in opinion nearly always said that the time required was "too short" (Figure 1B). Men who received all of their training at the University of Minnesota were more likely than the others to express an opinion on this subject and to indicate that the time requirement was "too short." Although the general opinion was about the same for men registered at various times, the group registered before 1940 was most apt to rate the time requirement as "too short," while those registered in the 1950's most often thought the time requirements were "about right."

Figure 1B: APPRAISALS OF ACADEMIC TRAINING IN ARCHITECTURE
Ratings of Cultural Aspects of Academic Training, Admission Requirements,
and Length of Program by All Architects



A related question asked the architects to indicate which of five suggested programs of architectural education would, in their opinion, provide the most effective training for architectural students. The five alternatives, varying from a program consisting only of field training to one requiring seven to eight years of academic and professional training, are listed below, with the percentage of architects that recommended each one.

<u>Programs</u>	<u>Percentage of Total Group Recommending*</u>
Field training (no formal academic training)	1
Bachelor of Arts with major in Architecture (4 years)	1
Bachelor of Architecture with engineering emphasis (5 years)	32
Bachelor of Arts and Bachelor of Architecture (6 years)	42
Non-professional undergraduate degree prerequisite to three or four year professional program (7-8 years)	13
Other recommendations	11
No recommendation given	4

* Percentages add to more than 100 per cent because a few individuals made more than one recommendation.

As the percentages indicate, the largest proportion of the architects (42 per cent) thought that the six-year program, which enables a student to earn both a Bachelor of Arts and a Bachelor of Architecture degree, provides the most effective training for architectural students. This strong preference for the longer degree program is particularly interesting in view of the distribution of degrees actually held by these men (see Table 3). Although only five per cent of the respondents had earned both arts and professional degrees, more than 40 per cent thought that such a program provides the most effective training. Preference for this combined degree program was particularly notable among the Minnesota-trained architects, half of whom gave it as their preference.

The second most preferred program was the five-year plan which leads to the Bachelor of Architecture degree with engineering emphasis. Approximately one-third of the entire group thought that this type of program provides the most effective training for architects. Preference for this plan was far greater among the men trained in schools other than Minnesota, however, than it was among Minnesota graduates. A third alternative, in which a non-professional undergraduate degree is prerequisite to a three or four-year professional program was recommended by 13 per cent of the entire group, especially by the men who had degrees from both Minnesota and other institutions (29 per cent of whom gave this as their first preference).

The men who had become registered architects most recently were strongest in their preference for the six-year program while those registered before 1940 most frequently advocated the five-year program. Interest in the longer combined preprofessional and professional program was also strongest among the men registered most recently. In general, it can be said that the men registered more recently were the strongest advocates of the longer programs. In this respect the recommendations did not correspond with the ratings given to the time required for completing academic training, in which the men registered earliest were the ones most inclined to consider that their training time had been too short.

Appraisals of Present Program

When the architects were asked for judgments of the adequacy of preparation of students currently completing academic work in architecture through the question:

"Do you feel that recent graduates of the School of Architecture have had the qualifications you expected of an architect-in-training?"

the responses were none too enthusiastic. Slightly more than one-third (37 per cent) said "Yes," about one-fourth answered "No" and nearly a third were "Uncertain." Comments given with reference to the preparation of architects-in-training ranged from the positive --

"Yes, we got what we expected. We do not expect a finished product and do not welcome youngsters with a frozen architectural philosophy." --

to the negative:

"No, too little ability to be a draftsman. Have to learn at expense of employer."

Type of Program. -- Reactions to one possible revision of the present program of the School of Architecture was obtained by the question,

"Do you believe that some type of program should be available within the School of Architecture for able students who cannot succeed in the existing architectural curriculum because they lack design ability?"

While one-fourth (26 per cent) of the architects said "No" and nine per cent were "Uncertain" about the desirability of offering a non-design oriented program, the majority of the group (60 per cent) answered "Yes" and many of them went on to make specific suggestions as to the type of program which should be offered:

"Professional management course emphasizing structure, mechanics, office practice, specification, supervision, public speaking, salesmanship, accounting, etc. Most professional architects succeed on these points, not in design ability."

"A program that could stress or improve his administration abilities and production alertness and efficiency."

"Bachelor of Architecture course could have two majors: Design and Construction with emphasis on Structural."

"One that would train the student for specification writing, or some other specific phase of the profession with a degree other than Bachelor of Architecture."

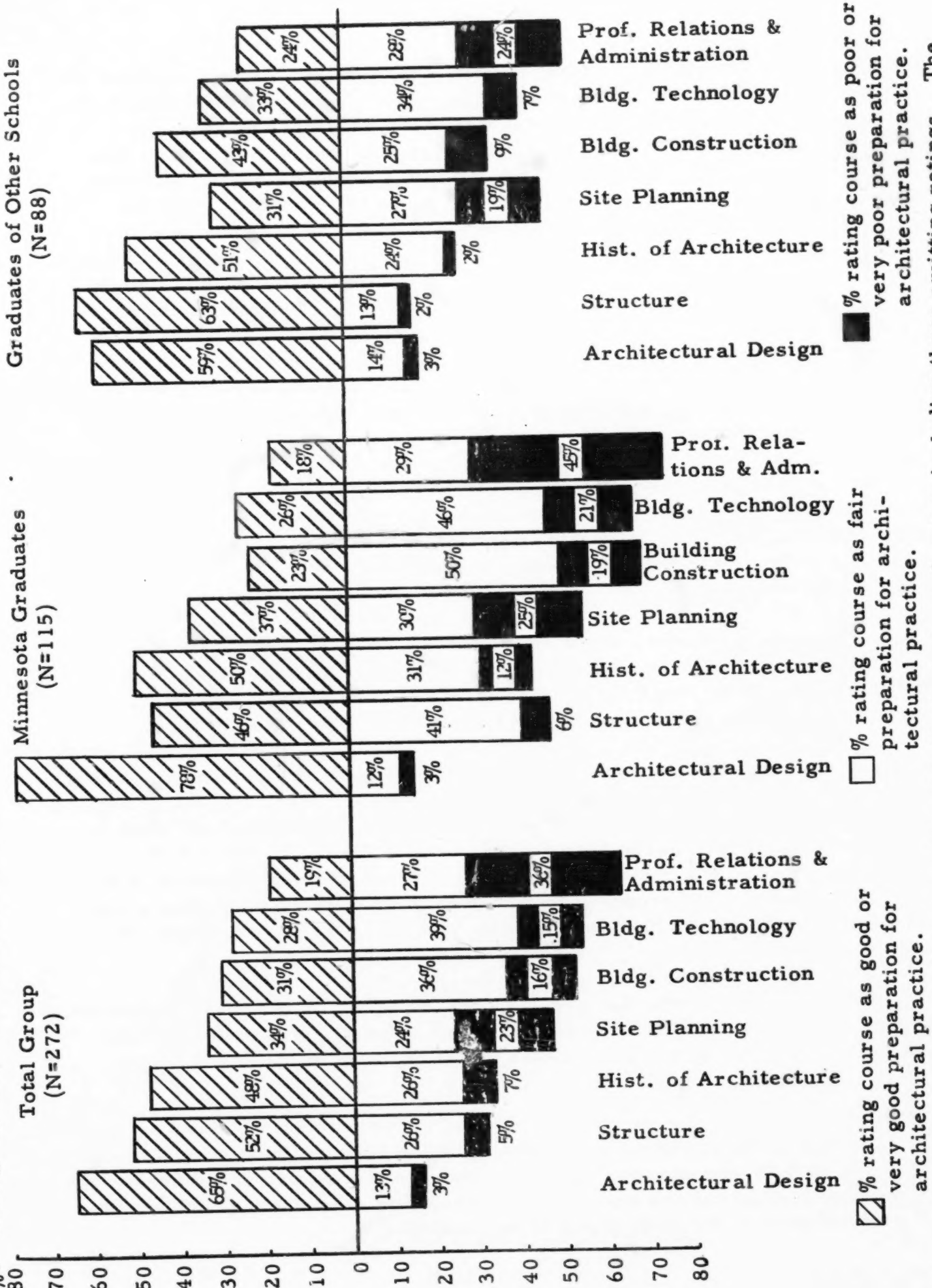
"Definite need in profession for competent specification writers, supervisors, administrators, and most of all ability to translate design into working drawings. University of Minnesota recognized only one talent during my time there -- Design."

"Architectural engineering as once offered . . . The civil engineering curriculum does not fill this need."

Appraisals of Specific Courses

Courses in seven fields of architectural study were rated by each respondent with respect to the extent to which he felt it had provided adequate preparation for architectural practice. Ratings were made on a five-point scale ranging from "very good" to "very poor," with intermediate ratings of "good," "fair," and "poor." The distribution of the ratings given for each course are shown in Figure 2A for the entire group of responding architects, for the men who had all degrees from the University of Minnesota, and for

Figure 2A: HOW WELL DID ARCHITECTURE COURSES PREPARE MEN FOR ARCHITECTURAL PRACTICE?
 %* Ratings by All Architects, by Minnesota Graduates and by Graduates of Other Schools of Architecture



* Percentages are based on total number of individuals in each group including those omitting ratings. The difference between the sum of percentages represented by each bar and 100% is the percentage making no rating.

the group who had all their degrees from other schools.¹ The length of the bar above the horizontal line indicates the percentages of individuals in the group who rated the course as "good" or "very good" preparation for architectural practice. The bar length below the line is divided into two sections, the heavily shaded part indicating the percentage that rated the course as "poor" or "very poor," and the unshaded part indicating the percentage of "fair" ratings. The length of the entire bar indicates the percentage of the group that provided a rating.

As Preparation for Architectural Practice. -- The most highly rated courses were those in Architectural Design, which 65 per cent of the respondents rated as "good" or "very good" preparation for architectural practice. Courses in Structure and the History of Architecture were also given favorable ratings by a majority of the group providing ratings. Professional Relations and Administration courses received the smallest percentage (19 per cent) of favorable ratings and the largest percentage (36 per cent) of unfavorable ratings. Building Construction and Technology courses received relatively few favorable ratings and a greater number of "fair" marks than other courses. Appraisals of Site Planning courses were the most evenly distributed between the favorable, "fair," and unfavorable classifications.

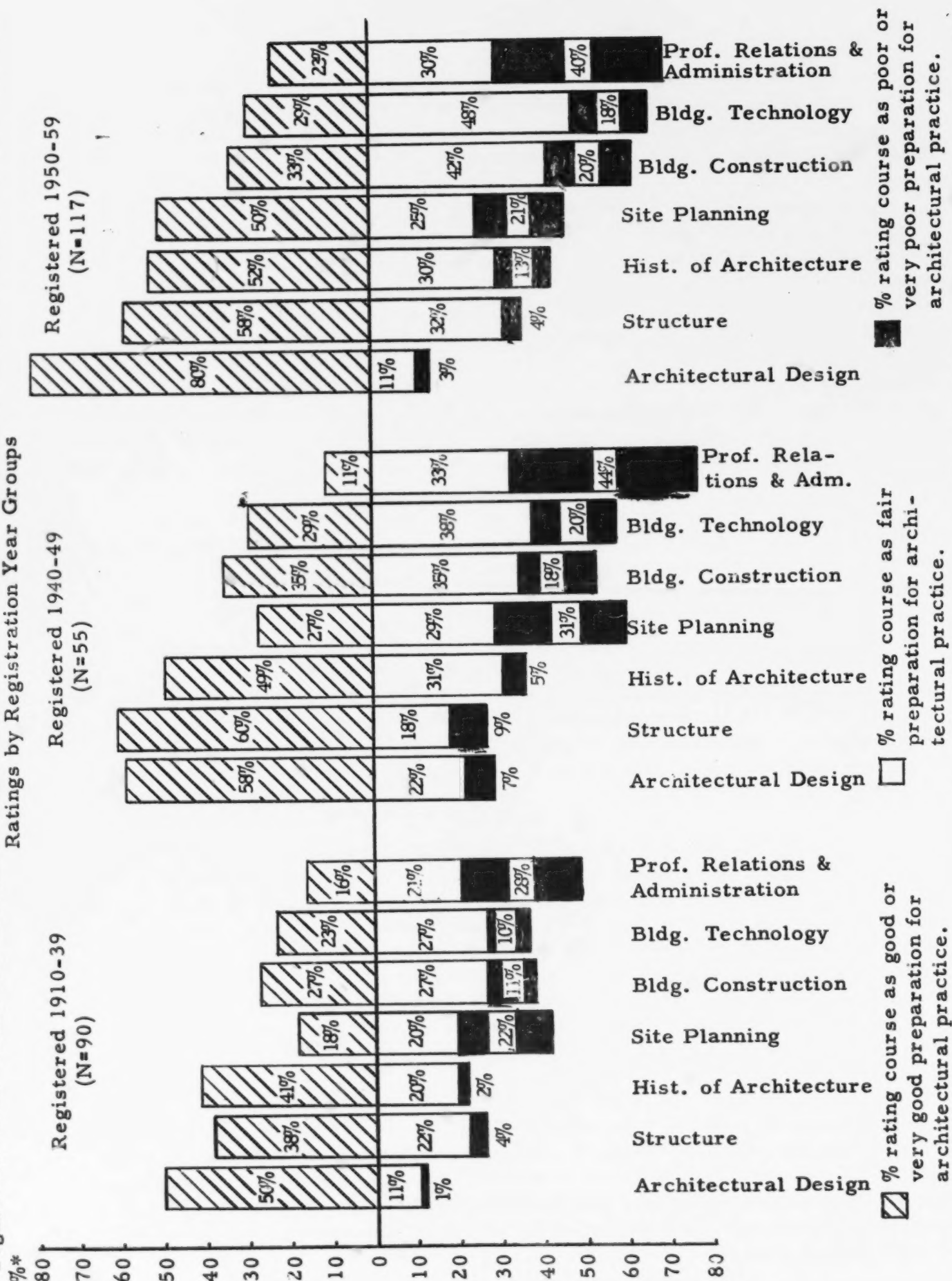
Minnesota graduates, more often than the graduates of other schools, gave favorable ratings to courses in Architectural Design, but were less inclined to do so for their Structure courses. They also gave less favorable ratings to courses in Building Construction and Building Technology.

Comparisons of the course ratings made by men who became licensed as architects at various times was limited because a large number (more than one-third, between 36 and 40 per cent) of persons registered prior to 1940 did not provide course ratings (Figure 2B). Some of these men indicated that they were too far removed from their own course experience to make such appraisals. The proportions who did not provide ratings were much smaller for the groups registered in the 1940's (13-15 per cent) and the 1950's (7 per cent).

Comparing those who did provide course ratings in the three registration groups, the most notable difference was the large proportion of favorable ratings (nearly twice that of the other groups) given to the Site Planning

¹ To simplify the presentation of findings, the ratings made by the small group of men who earned degrees at both the University of Minnesota and another institution are not shown or discussed separately, although they are included in the total group of respondents.

Figure 2B: HOW WELL DID ARCHITECTURE COURSES PREPARE MEN FOR ARCHITECTURAL PRACTICE?
Ratings by Registration Year Groups



* Percentages are based on total number of individuals in each group including those omitting ratings. The difference between the sum of percentages represented by each bar and 100% is the percentage making no rating.

courses by men who had most recently completed registration procedures. These men were also definitely satisfied with their Design courses as professional preparation. In ratings of other courses they did not differ markedly from the groups registered before 1950.

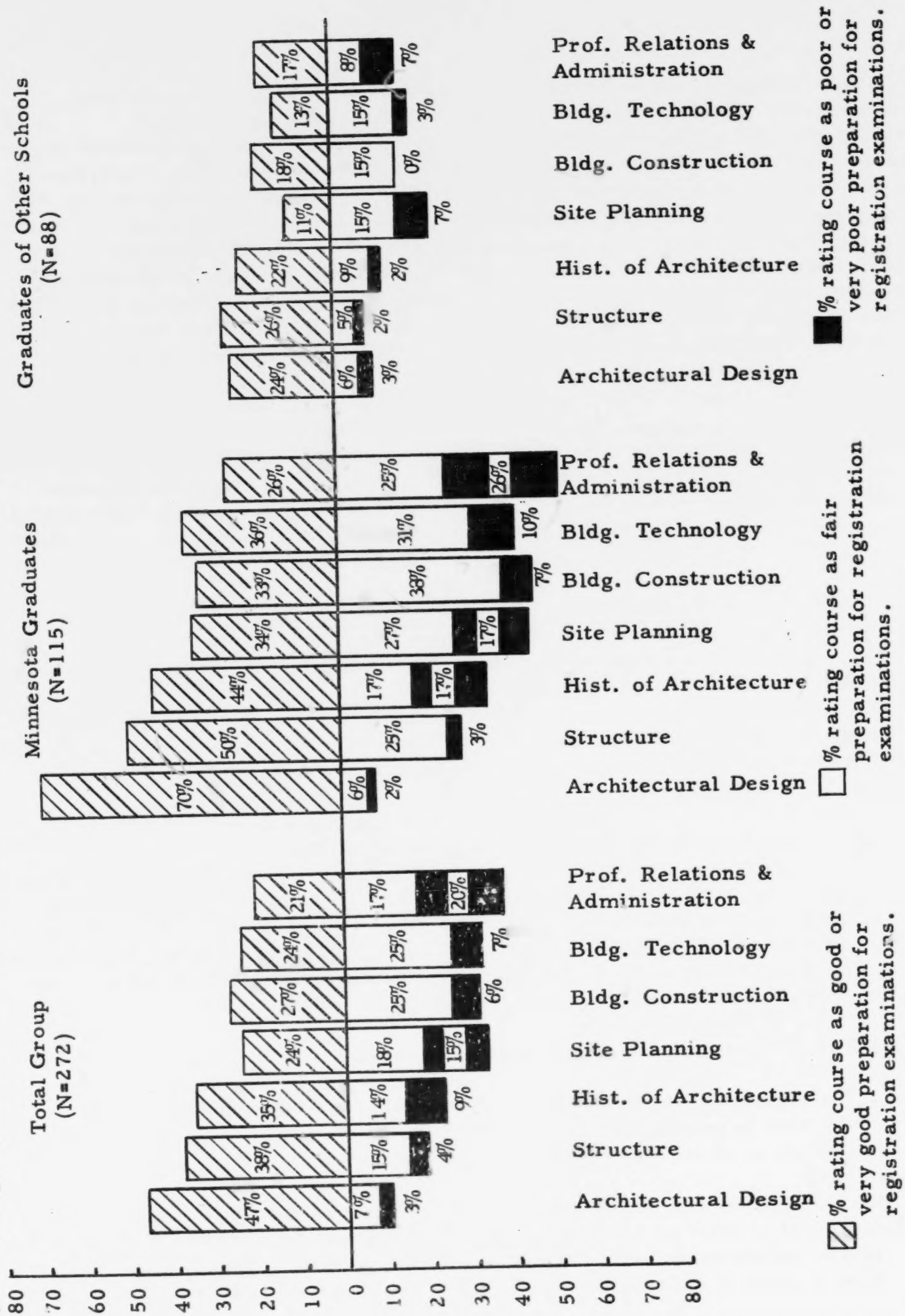
As Preparation for Registration Examinations. -- Architects who had become registered through Minnesota registration examinations were asked to indicate how well they felt the seven courses had prepared them for the examinations. Their ratings are reported in Figures 3A and 3B in the same manner as in Figures 2A and 2B. Since the overall length of each bar indicates the percentage of the group that provided a rating for the course, it is apparent that a much larger proportion of Minnesota graduates (about three-fourths) than of graduates of other schools (about one-third) provided these ratings. Generally, about 80 per cent of the men registered since 1950 provided ratings compared with slightly more than 60 per cent of those registered in the 1940's and about 25 per cent of those registered before 1940.

The pattern of ratings of courses with respect to the preparation they afforded for the registration examinations was generally the same as those for professional practice. Architectural Design courses were most highly rated, with Structural Design and History of Architecture courses next. Each of these courses was rated as "good" or "very good" preparation for the examinations by at least 35 per cent of the group and by more than half of those making a rating. Professional Relations and Administration courses were least favorably rated. More than a third of those who rated this course (20 per cent of the total group) said that it afforded poor preparation for the examinations. The examination preparation afforded by courses in Site Planning was also rated as poor by a sizeable proportion of those who provided a rating.

Minnesota trained men generally thought that their courses in Architectural Design and in Structure prepared them well for the registration examinations. While the proportion of Minnesota graduates who thought well of their preparation in History of Architecture was also fairly sizeable (44 per cent), a relatively large proportion (17 per cent) rated it as "poor" or "very poor." Course preparation for the Professional Relations and Administration examination was rated as poor by a fourth of the Minnesota group (more than a third of those who gave a rating). The Site Planning examination preparation was also given a high proportion of "poor" or "very poor" ratings by the Minnesota graduates.

Graduates of schools other than the University of Minnesota generally did not rate the adequacy of their course preparation for examinations, but those who did were also most critical of their preparation in Site Planning and in Professional Relations and Administration. In addition, they were generally not as satisfied as the Minnesota men with their preparation in Architectural Design.

Figure 3A: HOW WELL DID ARCHITECTURE COURSES PREPARE MEN FOR REGISTRATION EXAMINATIONS?
 %* Ratings by All Architects, by Minnesota Graduates and by Graduates of Other Schools of Architecture



*Percentages are based on total number of individuals in each group including those omitting ratings. The difference between the sum of percentages represented by each bar and 100% is the percentage making no rating.

The ratings of course preparation for examinations given by the men who probably took these tests at various times as indicated by their registration dates (Figure 3B) indicate that the men who were registered in the 1940's were generally more satisfied than the rest with their preparation in History of Architecture and less satisfied with their preparation for the Structure and Site Planning examinations. The individuals who most recently experienced the registration examinations were most satisfied with their preparation in Architectural Design and in Structure. Ratings of adequacy of preparation in other fields by the men who became registered during the 1950's differed largely in terms of the relative proportion of "fair" versus "poor" ratings. About one-third of the men thought their course preparation was "good" or "very good" for the Building Construction and Building Technology examinations; close to 40 per cent thought it was "fair," and "poor" ratings were relatively infrequent. On the other hand, preparation for the History of Architecture and Site Planning examinations tended to be rated at one extreme or the other. Preparation for the Professional Relations and Administration examination was generally rated least adequate (just as it was for architectural practice), even though almost a third gave this course a "good" or "very good" rating.

Strengths and Weaknesses in Professional Preparation. -- When the architects described the aspects of their own academic training which they felt were either quite strong or very weak, the same areas of strength and of weakness emerged as in the rating analyses just reported. Nearly two-thirds of the respondents named Design courses as an area of strength in their own academic training. A distant second and third in frequency of mention as areas of strength were Structure and Structural Design (29 per cent) and History of Architecture (21 per cent).

The two subject areas most often mentioned as weak elements in professional preparation were Professional Relations and Administration (listed by 43 per cent of the group) and Building Construction and Technology (also listed by more than 40 per cent). No other area was named by as many as 20 per cent of the group, but the lack of sufficient general cultural background was cited as a weakness by 16 per cent. Specific comments about the courses most often cited as weak include the following:

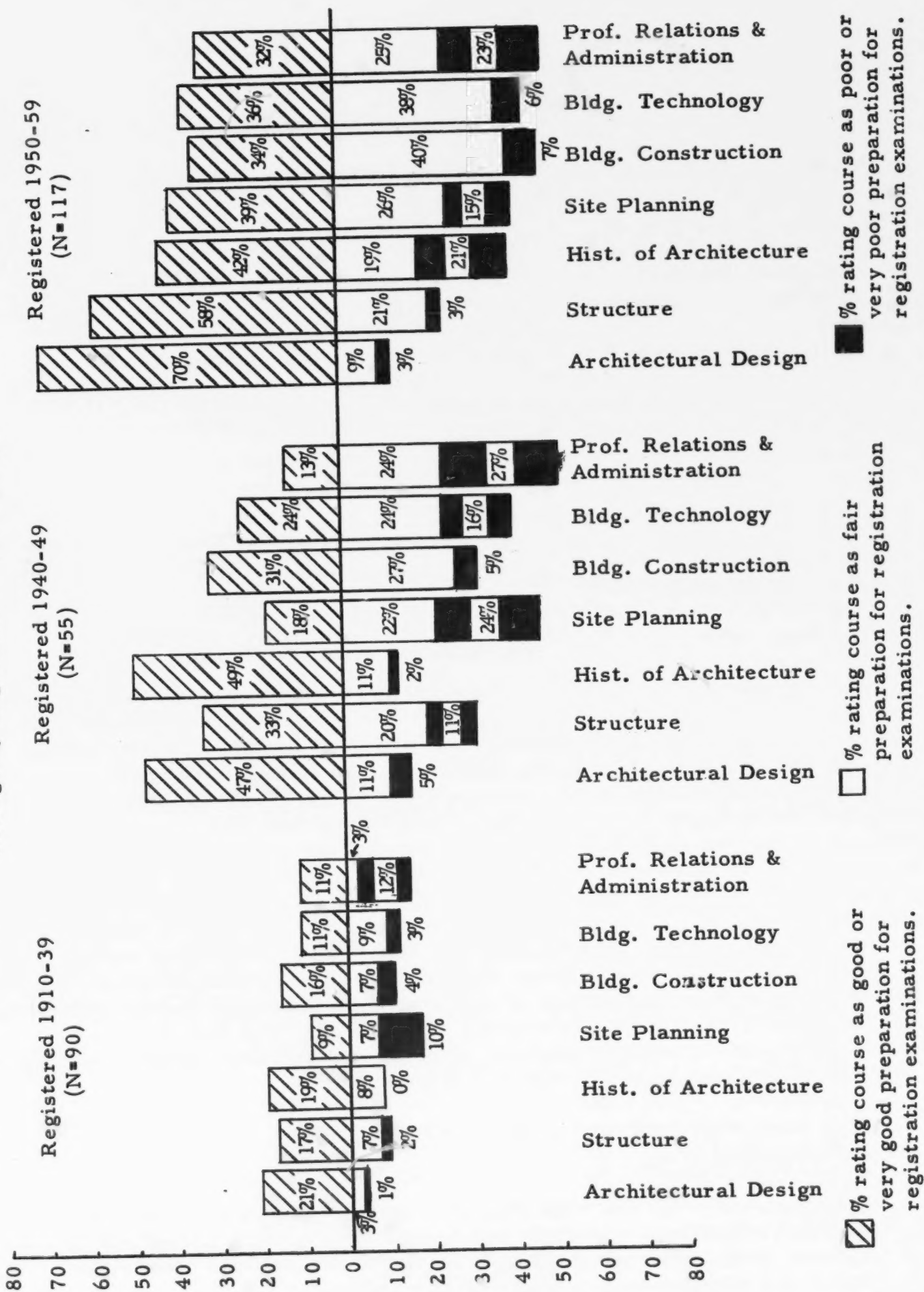
Professional relations and administration courses --

"There was little emphasis on many problems which consume much of one's time in practice: client psychology, office and job management, organization of various trades and how they work."

"Most practical and ethical aspects were not adequate, but there, perhaps, is a limit to what an academic course can legitimately seek to prepare a single individual to be proficient in. Some areas of practice are, perhaps, best learned in offices, but much better control and organization is needed."

"Client contacts were weak. No client has a well-developed program. Architect's hardest job is to find out what the problem is."

Figure 3B: HOW WELL DID ARCHITECTURE COURSES PREPARE MEN FOR REGISTRATION EXAMINATIONS?
Ratings by Registration Year Groups



* Percentages are based on total number of individuals in each group including those omitting ratings. The difference between the sum of percentages represented by each bar and 100% is the percentage making no rating.

Building construction and technology courses --

"Too little emphasis on technical aspects of materials, structure, etc."

"Courses in building materials, building construction, and professional relations were inadequate and poorly taught."

"Received too great a portion of building construction instruction from non-practicing instructors. Prerequisite for teaching structure, building construction, etc., should be experience in field of instruction."

Design courses, which were generally considered "outstanding above all other courses," were nevertheless, criticized by some for lack of practical application. Comments to this effect included the following:

"Design problems were impractical. Design was never governed by allowable costs."

"No adequate opportunity to verbally present design solutions. In practice this is especially important."

"Not enough emphasis on relation of work endurance, mechanical work, to design work."

Many of the architects felt that their programs had been too academic and that "greater emphasis (should have) been placed on more practical work with field trips to material suppliers, shops, important buildings, and jobs under construction." Several decried the lack of connection between academic training and practice, and the resultant unrealistic programs. Others were more inclined to argue for a more theoretical background than they had received. One man said that "little or no attempt was made to understand the philosophy of architecture, or if understood, to translate it to the student." Still another deplored the "tendency to fail to perceive major issues in a problem without first working it completely through." And quite a number of persons spelled out their concern about the lack of general cultural background provided by their programs. As one man said, "the general architecture course lacks cultural subjects, also general appreciation of language, natural sciences, etc." Another regretted "not having had time in a busy schedule for more courses of a general cultural nature." Lack of work in public speaking was specifically deplored by quite a number of the men.

"Too much regimentation" in the present program was also criticized. One man described it as:

"Today present program, tomorrow present preliminary plan, next day (present) schedule of materials and typical details, etc. I often felt, perhaps unjustly, that a student not gifted in the art of presentation stood little chance for recognition of a good design solution."

The men trained in Minnesota and elsewhere were in substantial agreement in their identification of strong and weak points. Both groups mentioned Design as an area of strength most frequently, and Building Technology and Construction and Professional Relations and Administration as weak points. The registration year groups did not differ notably, either, in the aspects of the program that they identified as strong or weak. A general tendency for the men more recently registered to make more comments was noted here as elsewhere. Perhaps most significant was the fact that the percentage mentioning Site Planning as an area of strength varied from eight per cent of those who were registered before 1940 to 21 per cent of those who registered after 1950. The reader is reminded that a similar difference was noted in the analyses of course ratings. Conversely, the most recently registered men, more often than any other group, mentioned Professional Relations and Administration as a weak area. Forty-seven per cent of the men registered in the 1940's and 48 per cent of those registered in the 1950's pointed to this as a weak area compared with 31 per cent of those registered before 1940.

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CHAPTER IV

APPRAISALS OF ARCHITECTURAL COURSE OBJECTIVES

To provide a clearer understanding of the bases for the general appraisals of architectural courses discussed in the previous chapter, each architect was asked to indicate, using a five-point scale (ranging from "extremely well-achieved" to "not achieved at all"), how well he believed he had achieved certain specific objectives of four architecture courses. He was also asked to rate the importance of these course objectives for good architectural training. The course subjects which were reviewed in this more detailed manner included Architectural Design, History of Architecture, Building Construction and Technology, and Professional Relations and Administration. The reader will recall that the first two courses had received generally favorable appraisals in the overall evaluations reported in Chapter III, while the latter two had more often received unfavorable appraisals.

Architectural Design Course Objectives

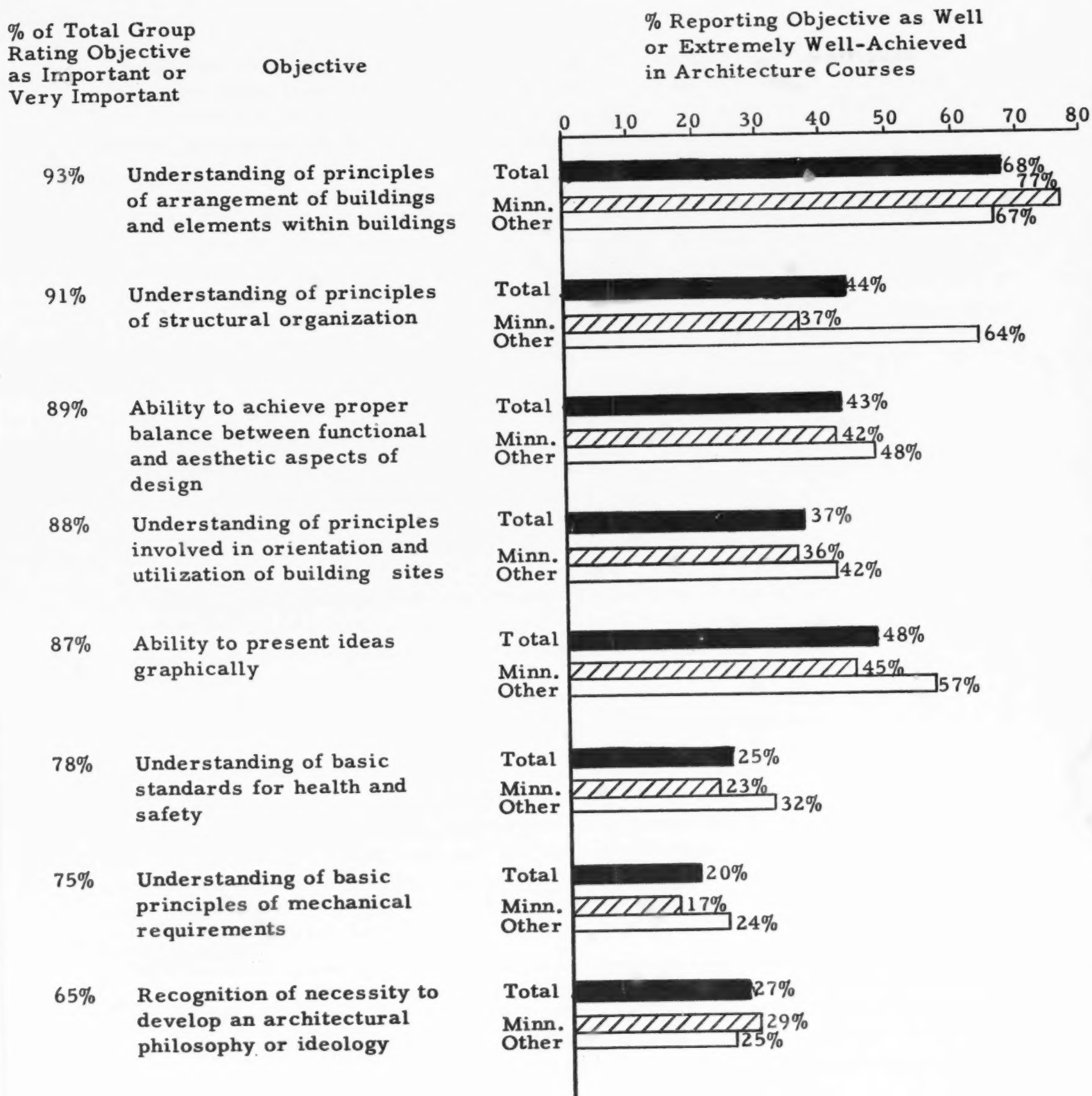
The eight objectives that were listed in the questionnaire for Architectural Design courses are shown in Figure 4 in the order of the frequency with which they were rated as "important" or "very important" objectives of architectural education by the architects who returned the questionnaires. The objective listed first -- understanding of principles of arrangement of buildings and elements within buildings -- was regarded as important by 93 per cent of the entire group, while the one listed last -- recognition of necessity to develop an architectural philosophy or ideology -- was identified as important by 65 per cent of the responding architects. The obvious importance of design to architects is reflected by the high proportions who rated the design objectives as "important" or "very important," all but one of the eight being so rated by three-fourths or more of all respondents.

The heavily shaded bars at the right in Figure 4 show the proportion of all respondents who felt that they had achieved each objective "well" or "extremely well" in the architectural courses that they took. The two other bars to the right of each objective represent the proportions of the Minnesota-trained architects and of the individuals trained elsewhere who indicated a high level of achievement of the objective.² Comparison of several methods

² To simplify the presentation of findings, the ratings made by the small group of men who earned degrees at both the University of Minnesota and another institution are not shown or discussed separately, although they are included in the total group of respondents.

Figure 4: HOW WELL WERE OBJECTIVES OF ARCHITECTURAL DESIGN COURSES ACHIEVED?

Ratings by All Architects, by Minnesota Graduates and by Graduates of Other Schools of Architecture



of presenting these achievement ratings indicated that a representative picture of relative strengths and weaknesses in attainment of objectives for each course would be provided if attention was focused on only the favorable ratings -- "well-achieved" and "extremely well-achieved" -- in combination. A detailed tabulation showing the percentage of respondents giving each of the five ratings for each objective appears in Appendix B. .

It is apparent that, for the Architectural Design course, the first objective was the one most often achieved by the entire group and by the groups educated at Minnesota and elsewhere. It would appear that it is in the achievement of this objective that much of the strength of the Architectural Design courses noted in the previous general appraisals of the Minnesota graduates lies. However, for the three design objectives which were rated as well-achieved by between 40 and 50 per cent of the total group -- understanding of principles of structural organization, ability to achieve proper balance between functional and aesthetic aspects of design, and ability to present ideas graphically -- the Minnesota-trained group lagged behind the group trained elsewhere in the proportion who indicated a high level of achievement. This was particularly true of the expressed achievement of an understanding of principles of structural organization (64 per cent of those trained elsewhere vs. 37 per cent of the group trained at Minnesota).

Generally, a larger proportion of the men who registered in the 1950's than of the other two registration groups reported a high level of achievement of the various design objectives (Table 9). These differences are due in part to a rather large percentage of individuals (about one-fifth) in the group registered before 1940 who gave no ratings on achievement of these objectives.

Table 9: ACHIEVEMENT OF OBJECTIVES OF ARCHITECTURAL DESIGN COURSES BY DATE OF REGISTRATION AS A LICENSED ARCHITECT WITH OBJECTIVES ARRANGED ACCORDING TO FREQUENCY WITH WHICH THEY WERE NOTED AS IMPORTANT

Per Cent of Total Group Rating Objective as Important or Very Important	Objective	Per Cent Reporting Objective as Well or Extremely Well-Achieved		
		Registered 1910-39	Registered 1940-49	Registered 1950-59
93	Understanding of principles of arrangement of buildings and elements within buildings	52	60	82
91	Understanding of principles of structural organization	32	49	50
89	Ability to achieve proper balance between functional and aesthetic aspects of design	31	42	50
88	Understanding of principles involved in orientation and utilization of building sites	22	35	47
87	Ability to present ideas graphically	48	47	47
78	Understanding of basic standards for health and safety	19	22	29
75	Understanding of basic principles of mechanical requirements	14	15	25
65	Recognition of necessity to develop an architectural philosophy or ideology	16	27	35

History of Architecture Course Objectives

Examination of the relative importance assigned to the objectives of History of Architecture courses, as indicated by the percentages shown at the left in Figure 5, indicates that the more factual objectives, such as the knowledge of the characteristics of great periods and knowledge of locations, dates, and periods of specific structures, were less often regarded as important than were objectives which involve an understanding of the influence of natural and social forces on architectural developments or the ability to evaluate architectural designs and to organize and present ideas effectively. It is interesting to note that of the four objectives which were considered by a third or more of the total group to have been well-achieved, one -- knowledge of periods and ability to recognize their characteristics -- was considered important by less than half (43 per cent) of the respondents. Conversely, only a fourth of the group thought that their History of Architecture courses had really impressed upon them the necessity of developing an architectural philosophy or ideology, although this objective was rated as important by over 60 per cent of the respondents. (The ratings given for this objective as an outcome of Architectural Design courses were not appreciably different.) Similarly the ability to organize and present ideas effectively was considered important by three-fourths of the group but well-achieved by only one-third. Only one person in eight (12 per cent) felt that it was important to know the location, dates, and periods of specific structures, although a fifth said that they had achieved this objective well or extremely well.

The men who had received all of their degrees at the University of Minnesota were similar to the other groups in the extent to which they felt the History of Architecture courses had taught them to evaluate architectural design and to understand geographic influences on architectural design. Their self ratings of achievement on other aspects of the History of Architecture course outcomes were, on the whole, less satisfactory. Notably fewer Minnesota men, for example, rated themselves as having achieved well the ability to organize and present ideas effectively, compared with men who had done all their work in other institutions.

Ratings of achievement of the history course objectives by the three registration groups (see Table 10) were generally not substantially different. The greatest difference involved the objective -- ability to evaluate architectural design -- which 44 per cent of the men who became registered in the 1950's rated as well-achieved, compared with 28 per cent of those registered before 1940. The men with more experience were more inclined to regard a well-developed knowledge of great periods and the ability to recognize their characteristics as the results of their study of the History of Architecture.

Figure 5: HOW WELL WERE OBJECTIVES OF HISTORY OF ARCHITECTURE COURSES ACHIEVED?

Ratings by All Architects, by Minnesota Graduates and by Graduates of Other Schools of Architecture

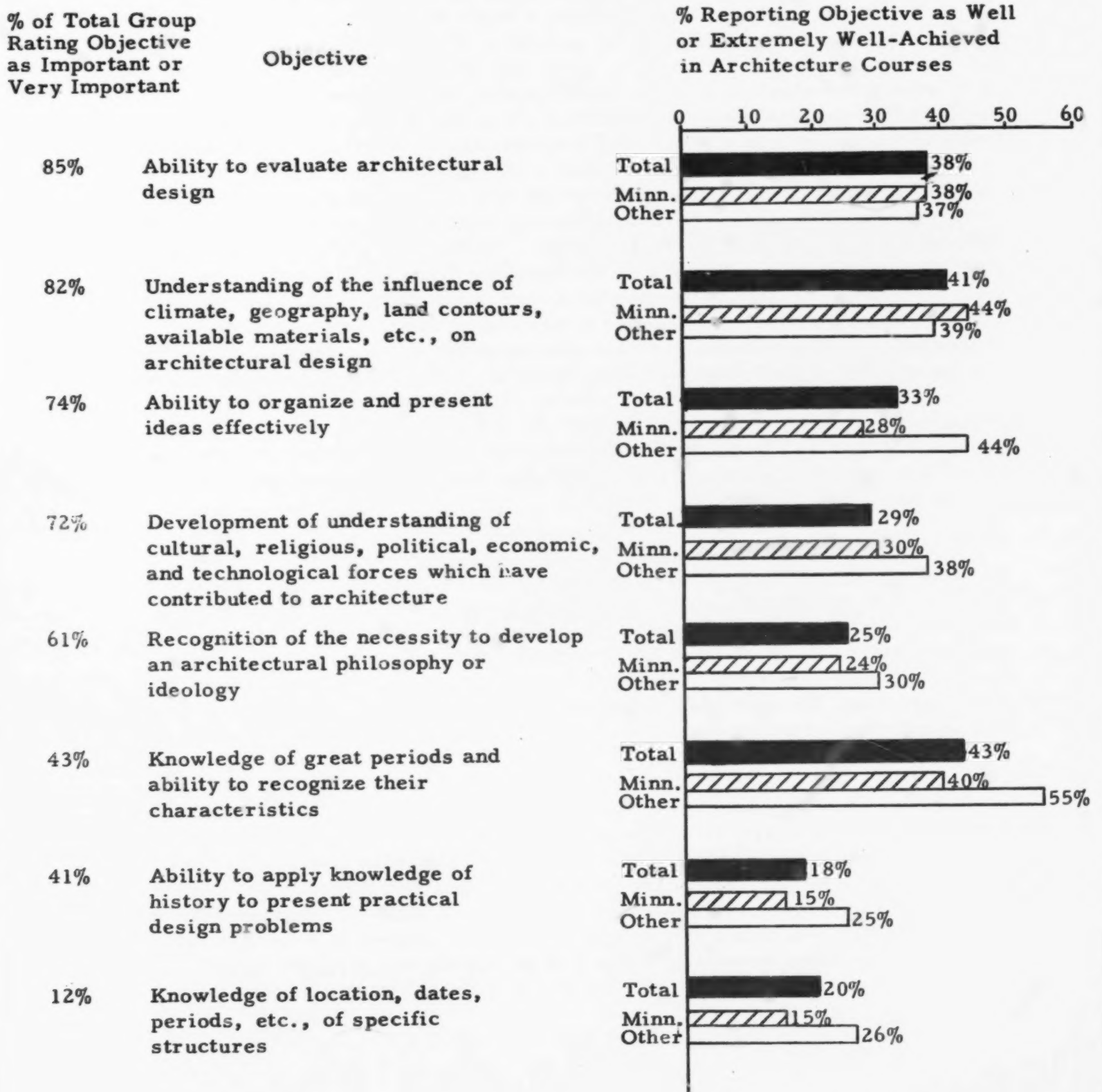


Table 10: ACHIEVEMENT OF OBJECTIVES OF HISTORY OF ARCHITECTURE COURSES BY DATE OF REGISTRATION AS A LICENSED ARCHITECT WITH OBJECTIVES ARRANGED ACCORDING TO FREQUENCY WITH WHICH THEY WERE NOTED AS IMPORTANT

Per Cent of Total Group Rating Objective as Important or Very Important	Objective	Per Cent Reporting Objective as Well or Extremely Well-Achieved		
		Registered 1910-39	Registered 1940-49	Registered 1950-59
85	Ability to evaluate architectural design	28	36	44
82	Understanding of the influence of climate, geography, land contours, available materials, etc., on architectural design	40	33	44
74	Ability to organize and present ideas effectively	36	36	28
72	Development of understanding of cultural, religious, political, economic, and technological forces which have contributed to architecture	22	36	29
61	Recognition of the necessity to develop an architectural philosophy or ideology	19	33	25
43	Knowledge of great periods and ability to recognize their characteristics	48	47	38
41	Ability to apply knowledge of history to present practical design problems	18	24	13
12	Knowledge of location, dates, periods, etc., of specific structures	19	22	21

Building Construction and Technology Course Objectives

Achievement of objectives covering the technical aspects of architecture (which it will be recalled were more frequently criticized than the two areas just discussed) involved appraisals of a considerably longer list of objectives than the other courses (see Figure 6). However, only eight of the 14 objectives listed were considered to be important by more than half of the total group. These included knowledge of particular aspects of construction work and of management activities, and the ability to apply such knowledge to practical problems. Less frequently rated as important was knowledge of specifics about ventilation, air conditioning, heating, plumbing, electrical equipment, and fire protection.

For only three of the 14 objectives of these courses did more than 30 per cent of the group report a high level of achievement -- knowledge of structural systems and design, knowledge of general construction details, and the ability to apply knowledge to practical problems. All of the remaining objectives, including five that were regarded as "important" or "very important" by more than half of the group, had been achieved well by less than 20 per cent of the group. As further evidence of the discrepancy between reported achievement in these areas and their judged importance, it might be noted that over 70 per cent of the group reported that they had "not achieved at all" or "achieved to a minor extent" only, knowledge of specifications and supervision.

Fewer Minnesota-trained men rated their achievement well in any of these various aspects of building construction and technology work than did men who had obtained degrees at other institutions. This disparity was particularly great with respect to knowledge of structural systems, design, and general construction details. It is also particularly notable that only a third (32 per cent) of the men registered in the 1950's thought that they had acquired the ability to apply knowledge to practical problems, compared with 44 per cent of the men registered in the 1940's (Table 11). Men registered in the 1950's were also less satisfied with their knowledge of structural systems, design, and general construction details.

Figure 6: HOW WELL WERE OBJECTIVES OF BUILDING CONSTRUCTION AND TECHNOLOGY COURSES ACHIEVED?

Ratings by All Architects, by Minnesota Graduates and by Graduates of Other Schools of Architecture

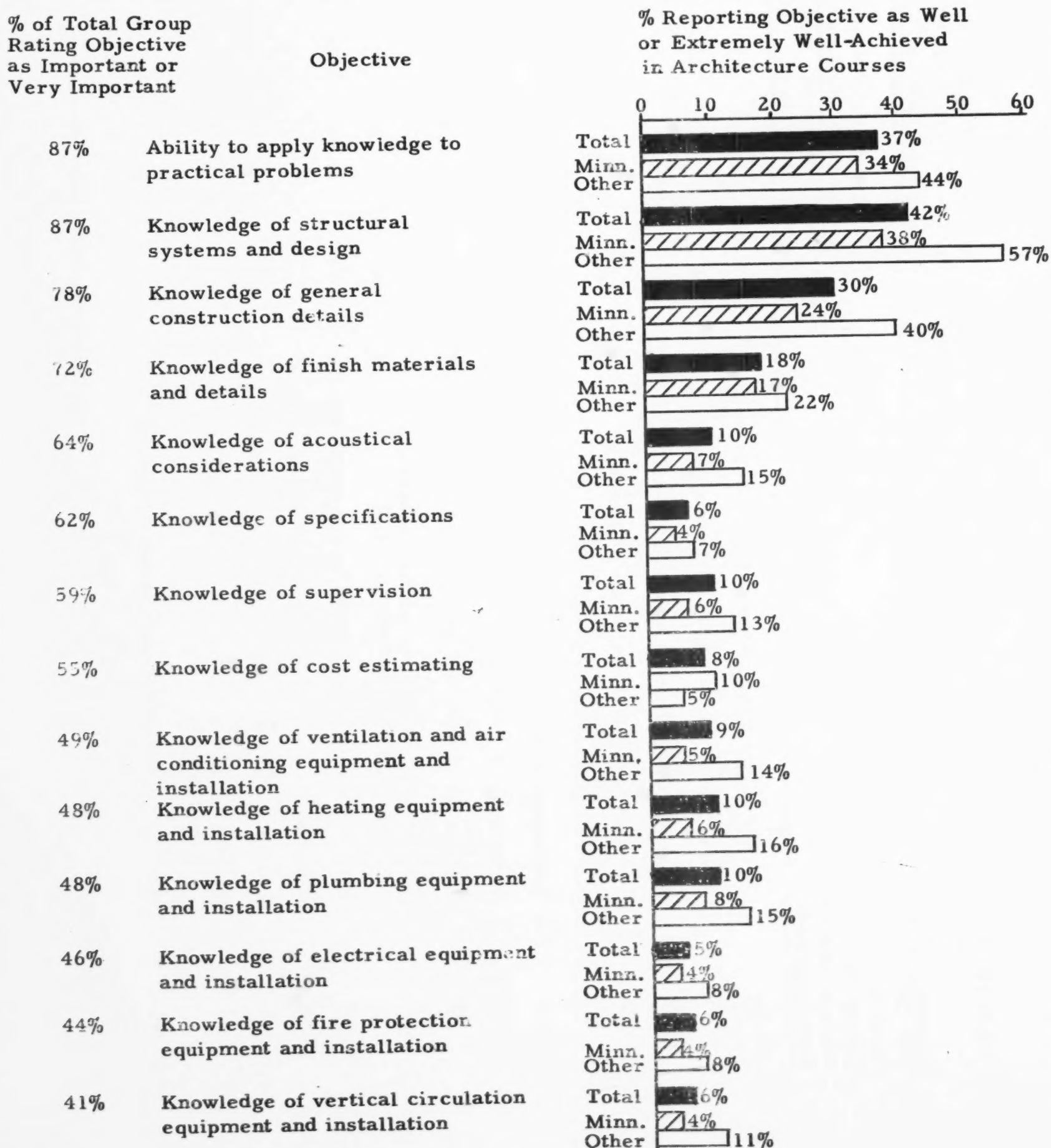


Table 11: ACHIEVEMENT OF OBJECTIVES OF BUILDING CONSTRUCTION AND TECHNOLOGY COURSES BY DATE OF REGISTRATION AS A LICENSED ARCHITECT WITH OBJECTIVES ARRANGED ACCORDING TO FREQUENCY WITH WHICH THEY WERE NOTED AS IMPORTANT

Per Cent of Total Group Rating Objective as Important or Very Important	Objective	Per Cent Reporting Objectives as Well or Extremely Well-Achieved			
		Registered 1910-39	Registered 1940-49	Registered 1950-59	
87	Ability to apply knowledge to practical problems	37	44	32	
87	Knowledge of structural systems and design	36	53	39	
78	Knowledge of general construction details	29	38	27	
72	Knowledge of finish materials and details	13	20	19	
64	Knowledge of acoustical considerations	10	7	9	
62	Knowledge of specifications	7	7	5	
59	Knowledge of supervision	11	9	7	
55	Knowledge of cost estimating	10	7	8	
49	Knowledge of ventilation and air conditioning equipment and installation	9	6	9	
48	Knowledge of heating equipment and installation	10	6	9	
48	Knowledge of plumbing equipment and installation	7	7	11	
46	Knowledge of electrical equipment and installation	4	2	4	
44	Knowledge of fire protection equipment and installation	7	6	4	
41	Knowledge of vertical circulation equipment and installation	7	4	7	

Professional Administration and Relations Course Objectives

Courses in Professional Administration and Relations were rated as "poor" or "very poor" preparation for architectural practice more often than others throughout the appraisals. Yet the objectives of such courses were rated as "important" or "very important" by three-fourths or more of the architects responding (see Figure 7). None of these objectives were reported as having been "well" or "extremely well-achieved" by more than 30 per cent of the group, but knowledge of the architect's administrative, supervisory, and legal responsibilities appeared to be least well-achieved.

Figure 7: HOW WELL WERE OBJECTIVES OF PROFESSIONAL ADMINISTRATION AND RELATIONS COURSES ACHIEVED?
Ratings by All Architects, by Minnesota Graduates and by Graduates of Other Schools of Architecture

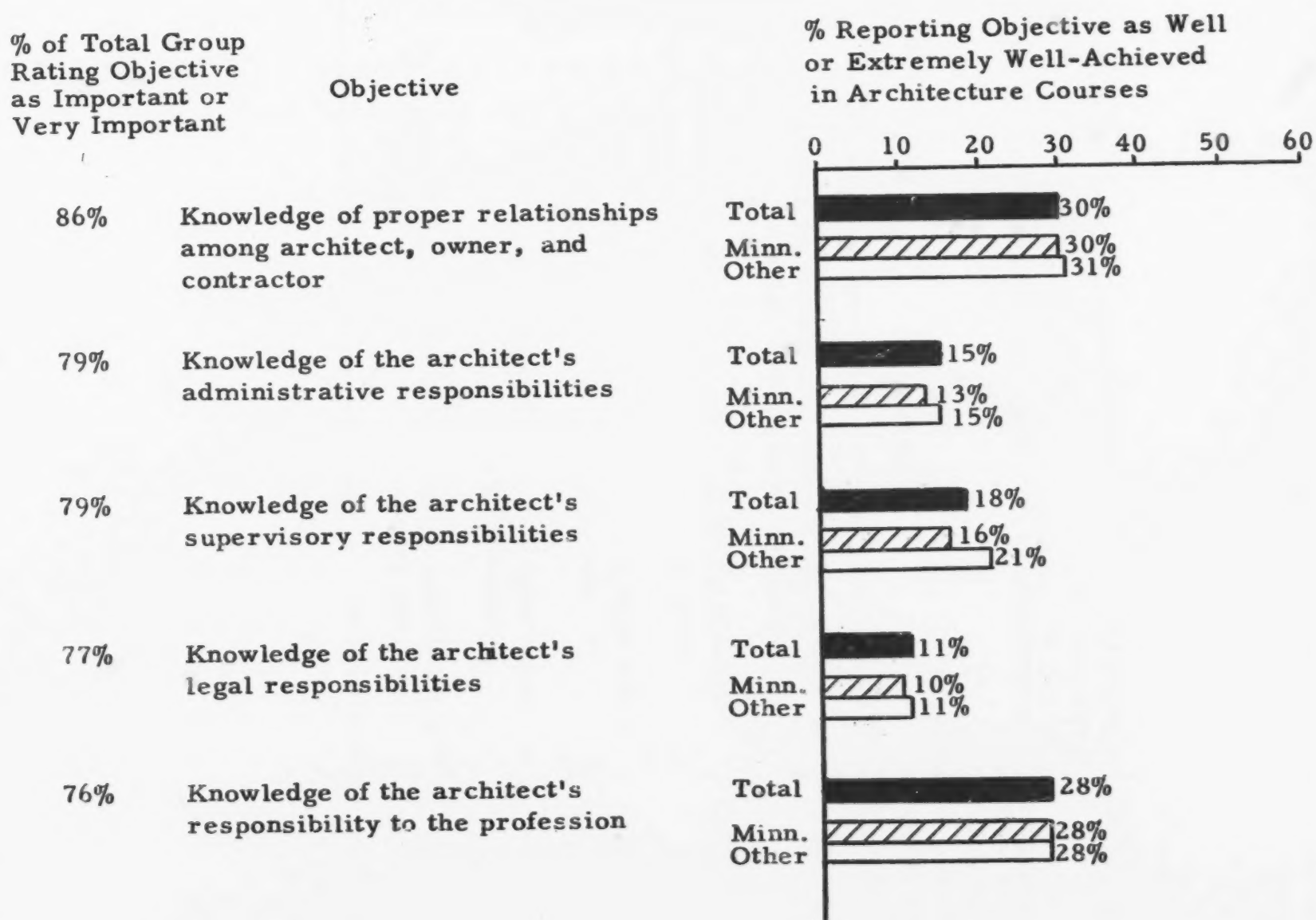


Table 12: ACHIEVEMENT OF OBJECTIVES OF PROFESSIONAL ADMINISTRATION AND RELATIONS COURSES BY DATE OF REGISTRATION AS A LICENSED ARCHITECT WITH OBJECTIVES ARRANGED ACCORDING TO FREQUENCY WITH WHICH THEY WERE NOTED AS IMPORTANT

Per Cent of Total Group Rating Objective as Important or Very Important	Objective	Per Cent Reporting Objective as Well or Extremely Well-Achieved		
		Registered 1910-39	Registered 1940-49	Registered 1950-59
86	Knowledge of proper relationships among architect, owner, and contractor	31	24	31
79	Knowledge of the architect's administrative responsibilities	20	9	13
79	Knowledge of the architect's supervisory responsibilities	20	15	15
77	Knowledge of the architect's legal responsibilities	14	5	8
76	Knowledge of the architect's responsibility to the profession	28	26	27

The school attended by the architect did not seem to be related to level of achievement on these objectives, but there were some differences in the reported achievement by architects who were registered at different time periods (Table 12). For example, men who became registered architects before 1940 more frequently indicated that they had achieved Professional Administration and Relations course objectives in their courses, than did those who became registered in the 1940's and 1950's. Nonetheless the differences among these groups were not marked, and the objectives of this course area were reported as less well-achieved than the objectives of any of the other courses studied by all architects.

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CHAPTER V

OPINIONS ON TWO RELATED PROFESSIONAL PROBLEMS -- REGISTRATION EXAMINATIONS AND MANDATORY RULES OF PRACTICE

In addition to the appraisals of academic training in architecture reported in the previous chapters, the plan of the study included brief surveys of opinions and recommendations on two related professional problems, the conduct of registration examinations and knowledge of violations of mandatory rules of architectural practice. The opinions expressed on these two subjects are reported in this chapter.

Registration Examinations

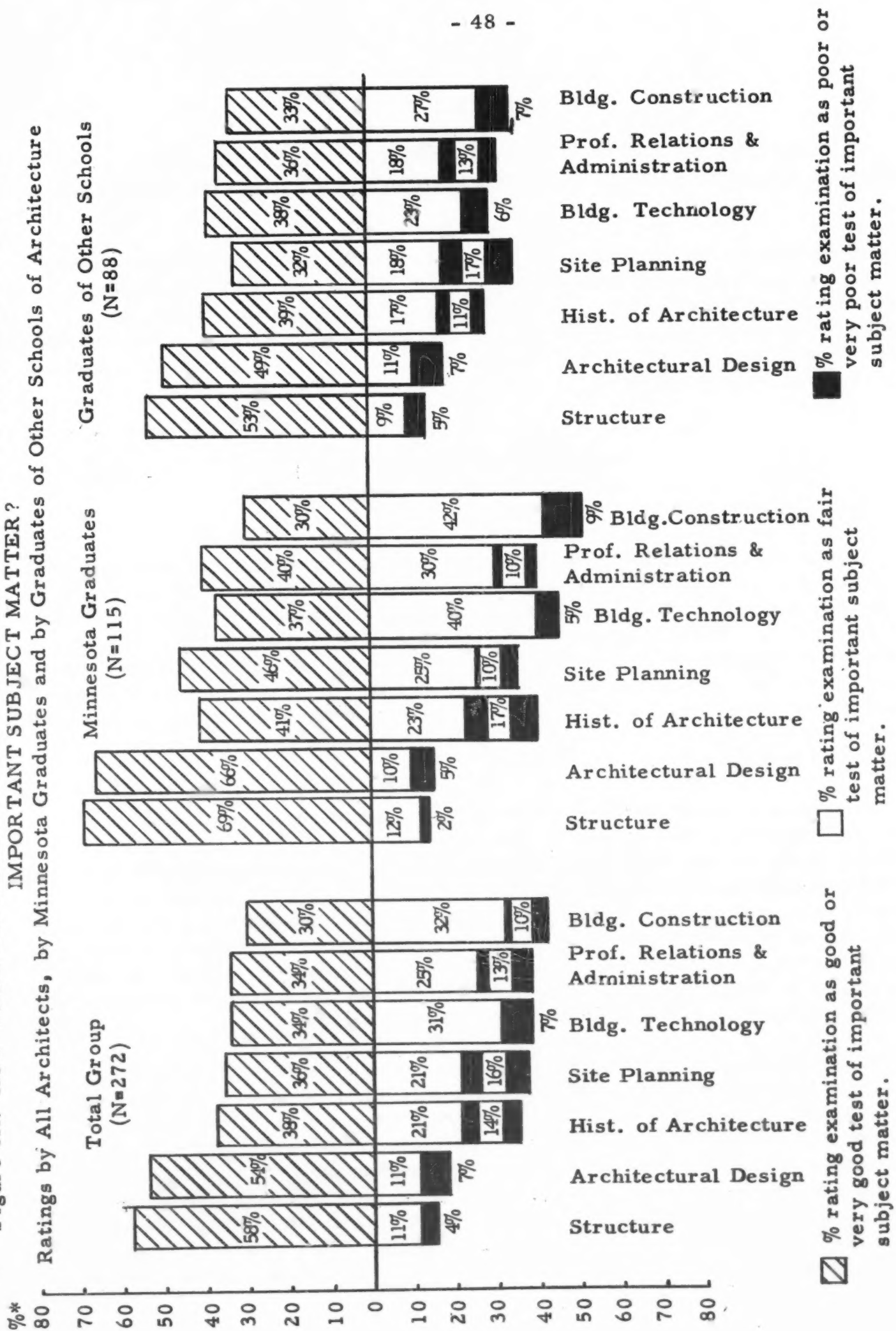
Ratings of Examinations

The architects who had registered through registration examinations were first asked to rate each of seven examinations on a five-point scale in terms of the extent to which they thought it tested their knowledge of really important subject matter. These ratings appear in Figures 8A and 8B. (Three-fourths of the entire group provided such ratings.) A larger proportion of Minnesota graduates (80 per cent) provided ratings of registration examinations than did graduates of other schools (67 per cent). As might be expected, many more of the men registered in recent years provided ratings than did those registered before 1940.

In general, one-third or more of the group rated each examination favorably, and less than one-sixth gave unfavorable ratings. The two fields in which examinations were rated highest, both by the entire group and by each subgroup, were Structure and Architectural Design. Over half of the entire group, and three-fourths of all who rated the examinations, regarded these two as "good" or "very good" tests of really important subject matter. The examinations which received the largest proportions of critical appraisals were those in Site Planning (16 per cent), History of Architecture (14 per cent), and Professional Relations and Administration (13 per cent).

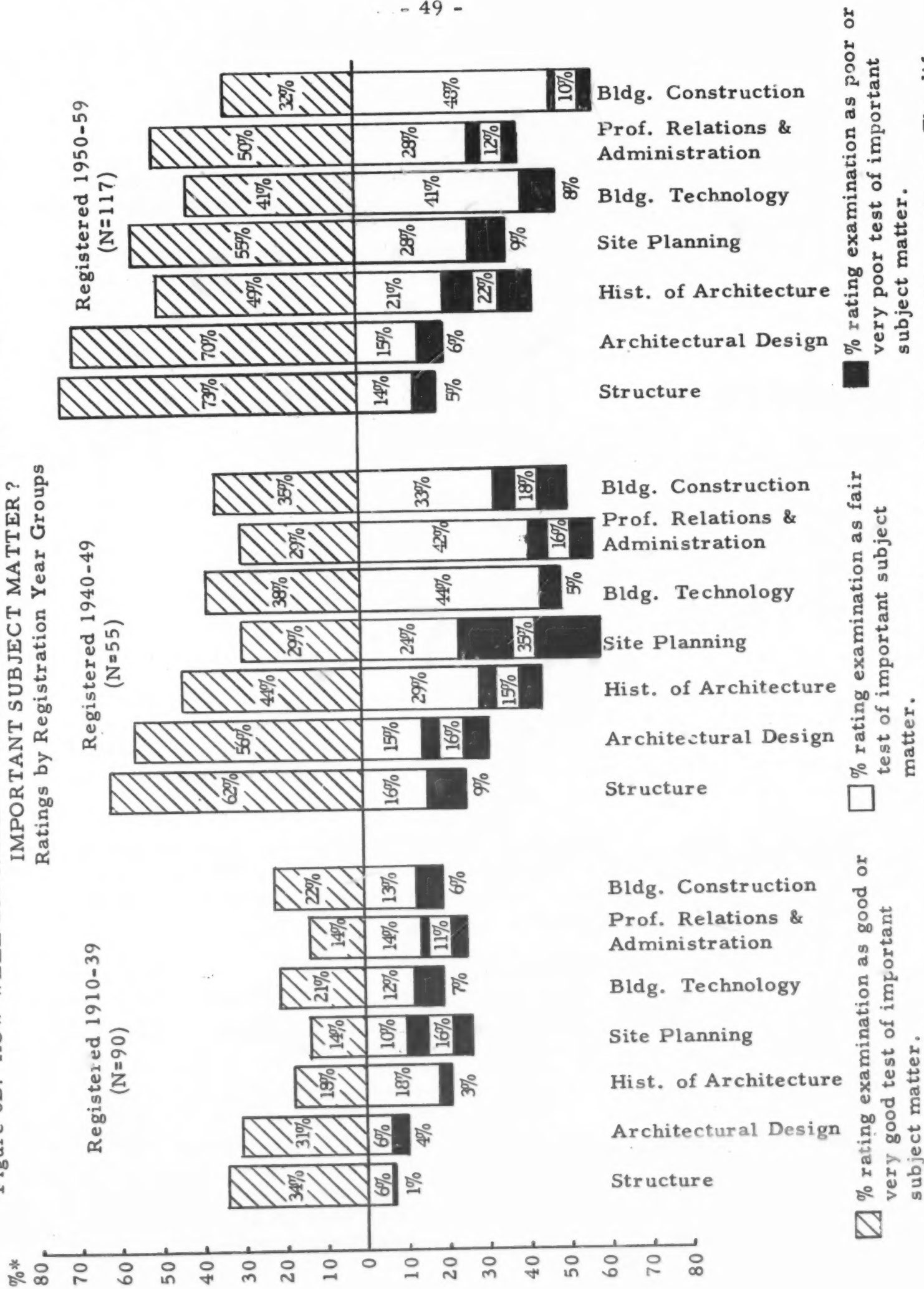
No really marked differences in the examination ratings given by the graduates of the University of Minnesota and of other schools were apparent except that the Minnesota graduates included a larger proportion who were favorably impressed with the Structure, Architectural Design, and Site Planning examinations. The men registered during the 1950's, who had had the most recent experience with the tests, were typically well impressed with most of the examinations, but the History of Architecture examination aroused a negative reaction from 22 per cent of this group. Men who were registered before 1950 were more critical than others of the Site Planning examination.

Figure 8A: HOW WELL DID REGISTRATION EXAMINATIONS TEST KNOWLEDGE OF REALLY IMPORTANT SUBJECT MATTER?



* Percentages are based on total number of individuals in each group including those omitting ratings. The difference between the sum of percentages represented by each bar and 100% is the percentage making no rating.

Figure 8B: HOW WELL DID REGISTRATION EXAMINATIONS TEST KNOWLEDGE OF REALLY IMPORTANT SUBJECT MATTER?
Ratings by Registration Year Groups



* Percentages are based on total number of individuals in each group including those omitting ratings. The difference between the sum of percentages represented by each bar and 100% is the percentage making no rating.

Comparison With Ratings of Course Examinations

One way in which registration examination ratings can be interpreted is by comparing them with similar ratings made of School of Architecture course examinations in the same subjects. While the overall pattern of favorable ratings for the two sets of examinations was about the same, certain differences occurred in the proportions of the total group giving comparable tests "good" or "very good" ratings.

<u>Registration Examinations</u>	<u>% Good or Very Good Ratings</u>	<u>School of Architecture Course Examinations</u>	<u>% Good or Very Good Ratings</u>
Structure	58	Structure	56
Architectural Design	54	Architectural Design	61
History of Architecture	38	History of Architecture	44
Site Planning	36	Site Planning	29
Building Technology	34	Building Technology	27
Professional Relations and Administration	34	Professional Relations and Administration	20
Building Construction	30	Building Construction	28

The registration examinations in Architectural Design and in History of Architecture were not rated highly quite as often as course examinations in the same fields, but generally the registration examinations received higher percentages of "good" or "very good" ratings than did course examinations, and lower percentages of "poor" ratings.

Ratings by Minnesota Graduates. -- A comparison of the ratings given to course examinations and to registration examinations by graduates of the University of Minnesota School of Architecture shows essentially the same relationships as for the total group:

<u>Registration Examinations</u>	<u>% Good or Very Good Ratings</u>	<u>School of Architecture Course Examinations</u>	<u>% Good or Very Good Ratings</u>
Structure	69	Structure	63
Architectural Design	66	Architectural Design	71
Site Planning	46	Site Planning	36
History of Architecture	41	History of Architecture	46
Professional Relations and Administration	40	Professional Relations and Administration	20
Building Technology	37	Building Technology	30
Building Construction	30	Building Construction	30

The proportion of Minnesota men giving favorable ratings for the registration examination in Professional Relations and Administration (40 per cent) was, however, notably larger than the proportion (20 per cent) going so for the course examination in this field.

Ratings of Men Who Registered in the 1950's. -- Analysis of the ratings on the two sets of examinations for men who were registered as licensed architects in the 1950's is of special interest, because these were the men most recently tested. The percentage of favorable ratings given by these men were:

<u>Registration Examinations</u>	<u>% Good or Very Good Ratings</u>	<u>School of Architecture Course Examinations</u>	<u>% Good or Very Good Ratings</u>
Structure	73	Structure	72
Architectural Design	70	Architectural Design	74
Site Planning	55	Site Planning	42
Professional Relations and Administration	50	Professional Relations and Administration	23
History of Architecture	49	History of Architecture	44
Building Technology	41	Building Technology	28
Building Construction	32	Building Construction	29

In all but one field -- Architectural Design -- the 1950 registration group gave a larger percentage of favorable ratings to the registration examinations than to their course examinations. The difference in ratings was considerable for the Professional Relations and Administration tests, on which 50 per cent rated the registration examinations favorably, compared with 23 per cent for the course examinations.

Suggestions for Improving Examinations

Some suggestions for improving the registration examinations were offered by about half of the architects. Many of these suggestions referred to the material tested in particular examinations, notably those in History of Architecture, Building Construction, and Design; but most of them dealt with broad questions of examinations policy such as whether there is any need for the examinations at all, what form of tests should be used, how better use might be made of the architect-in-training program, and how the examination board should be selected and the examinations conducted.

Need for the Examinations. -- Some respondents felt that graduation from an accredited school should satisfy much if not all of the registration requirements:

"Ultimately in a truly professional school completion of academic training should lead to registration following required practical service. Similar to European plan."

"College degree minimum or adequate professional studies and evidence of satisfactory attitude toward the profession. The exam itself is unnecessary except to test practical experience."

Others would not eliminate the examination entirely but would suggest that:

"Recognition should be given to the adequate passage of most of the academic material in the university and not repeat the same material in the professional examinations."

Still others suggested that certain examinations on architectural theory should be given upon completion of university education or even before graduation, while those on detailing, office practice, supervision, client contractor relationships, professional ethics, functions of building, etc., should be given after training in the field.

Material Tested. -- The most frequent recommendations (made by 11 per cent of the entire group and by one-fifth of those offering any suggestions) were for more emphasis on the understanding of principles and relationships in the examinations, rather than on factual details, such as the recall of dates, places, or formulae. Avoidance of detailed and exhausting problem solving was also recommended.

"Put less emphasis on detailed trivia and more on basic principles. For example, requiring design-oriented architects to go through mechanics of truss design, circuit computations, elevator or capacity problems, is stupid. These are specialized fields which we need only understand in principle. These things are nothing more than exercises soon forgotten, never used."

"More emphasis on judgment and general principles, less on specific details that require laborious repetition of study, duplicating what candidates were supposed to have learned in school. The two-stage examination which Minnesota has adopted is a step in the right direction."

"Examinations can be improved by: (1) Omitting questions dealing with information that is infrequently used. (2) Omitting questions that require many hours for their adequate solution. (3) Emphasis on questions that test practical knowledge of everyday problems of practicing architects."

The history examination was criticized by several for its over-emphasis on details:

"I hope by now the history exams have become less 'picky.' "

"I have heard complaints from men taking the Minnesota state registration exams that they thought too much emphasis was placed on one's knowledge of old cathedrals and many other historical buildings."

Building equipment examinations also apparently present a similar problem:

"Replace unreasonably great number of inquiries for information usually found in reference sources with fewer questions for discussion of various mechanical and electrical systems, analyses, etc."

"Broader approach; fewer sections through a double-hung window, etc."

"Men who took state exams state that there were too many minor and irrelevant questions which many registered architects could not answer such as, 'How much does a 16'0" escalator cost?', or 'How much does an elevator cost?' This information can be obtained easily from any elevator manufacturer."

Test questions which require development of a design for a type of building for which the architect might not have background led to several criticisms of present design tests and suggestions for improvements:

"The testing of architectural design because of the nature of the work is often a poor indication of one's design ability. If one is not familiar with the detailed program requirements for a certain type of building, he will be penalized by designing on the basis of incomplete background information."

"Design problem should not be on a building that depends on one basic decision and site planning problem."

"The title or subject of the design problems should be given several weeks in advance of the examination."

"Give advance notice of general type of building to be given as design problem, to allow research in general standards for the building type."

Others criticized the drawing required:

"My only complaints were the excessive amount of drawing for the design problems. The design exam at that time was easier for a fast draftsman than a thoughtful designer."

"Problem in design was a hard problem for a man who could plan such a project but could not complete a good perspective sketch quickly, in the 12 hours allowed. It gave a big advantage to a possible recent college graduate who was excellent at design and sketching, but who might not know much about working drawings; while a man good at planning and design was handicapped if he could not make a perspective in fast time."

Some suggestions were made for improving the judging of design problems:

"Design and site problems should be judged on broad basis, that is, not to rule out solution because, at the moment, they do not follow the current cliché."

"Be more critical of design and planning solutions. They should possess more than an 'acceptable' solution of minimal architectural quality. Those who have no interest or ability in these subjects should be culled out."

Types of Tests Used. -- A number of suggestions concerned the form of examinations used. As a rule each of these dealt with one aspect of the examination which was considered especially undesirable by the individual. For example, the "closed book" nature of the present test was criticized by a few people. One man said, "I doubt the significance inasmuch as this is not the case in practice." Another said:

"Present written examinations are unnecessary. Do not believe they are a fair test of a person's practical knowledge or ability to practice architecture. Remind me of a 'stump the experts' quiz program. I'm satisfied with an employee who doesn't know all the answers but who does know where to find them. Suggest, therefore, a return to open book type exam and practical examinations."

The usefulness of the oral examination was also questioned:

"The oral examination should be much more than the present exchange of pleasantries. It should be organized to test the practical application phase of architectural candidates."

"Oral interview is a farce. If this must be done, make it worth the time and miles -- to both board and applicants."

And a number of people thought the use of objective tests was undesirable:

"No objective, true-false etc., type exams (should be used). As far as possible (use) subjective type exams asking for discussions, solutions or specific answers. Although difficult and complicated to set up, specific buildings or projects might be judged and criticized. Actual work drawings, specifications, design, etc. of the candidate might be presented and discussed."

One person recommended that the board "consult with a professional testing organization in an effort to develop more sensible tests."

Use of Architect-In-Training Program. -- Greater reliance on the supervisor of the architect-in-training program for appraisals of candidates' qualifications was recommended by a few:

"A greater responsibility for the training of architects must be assumed by practicing architects in coordination with the architect-in-training program within their offices so that office experience can be the valuable educational process it must be."

"A closer examination and investigation of the applicant's actual examples of his work and interviews with his employers."

"A sort of syllabus might be provided for the architect-in-training, suggesting both to the trainee and his employer what he should hope to get from this period of work."

Examination Board and Procedures. -- A few architects had reservations about the present examining board:

"Registration board (ought) to be re-evaluated, to consist of strong, vital people of accepted stature in profession."

"Require examining boards to have members who have taken the exams."

And some had specific feelings about University of Minnesota influence on the examinations:

"It seems to me that the examination was written for the purpose and benefit of students from the University of Minnesota."

"Design jury must be non-university practitioners!"

Security on the Structural examination also appears to present some problems:

"Structural examination problem types should be changed every year. Students go in with previous test problems completely worked out. The structural review course should be stopped. It gives them answers only."

Other suggestions concerning examination procedures were:

"Examination should be given twice each year on definite fixed dates with results given to applicants not later than 30 days afterwards."

"Applicant should be advised of his grades following examination on sections failed. A critique should be given to point up reasons for failure."

"Require all architects to take exams -- eliminate 'grandfather' clause."

"Some few states try to protect their architects by making it difficult for architects from other states to secure registration by reciprocity. This should be corrected."

"N.C.A.R.B. should exert pressure to bring other lagging states to high uniform standard and wipe out petty politics. Then make reciprocal registration, through N.C.A.R.B., nationwide."

"Provide decent facilities in which to take examinations. Facilities in St. Paul are atrocious in the summer time. The civil service room had no ventilation, no windows, and no electric outlets, and a temperature of 98 degrees."

The statements selected for quotation above were chosen from those who made definite suggestions for the improvement of registration examinations. Quite a number of the architects took the opportunity to comment favorably on the present tests:

"They are pretty good when graded fairly. Should be difficult on matters affecting public safety like structure and mechanical."

"I feel that the registration examinations now are quite comprehensive in scope and seem adequate to produce architects with the capabilities of professional practice. Any criticism I might have would be a lack of attention to the practical and functional use of materials."

"Basically the N.C.A.R.B. exam is quite good. It would be a good thing if all states conformed to this exam, and had uniform requirements."

"I think the changes (that I would suggest) have been made since I took it."

"Believe exam has been and is improving."

Violations of the Mandatory Rules of Practice

Five actions of practicing architects that represented violations of certain mandatory rules of practice of the American Institute of Architects were described very briefly in the questionnaire. The architects were asked to indicate how often, to their personal knowledge, each type of violation had occurred in Minnesota during the past two years. The actions listed included: offering free services to a prospective client; competition with another architect in professional charges; profit-sharing agreements with contractors and others; public criticism of the work of another architect; and failure to encourage young men in the architect's employ to become registered.

Knowledge of Actions in Violation of Rules

Three-fourths of the architects completed the part of the questionnaire concerned with problems of architectural ethics. Many of those who omitted this section said that since they practiced primarily in other states they did not feel they were in a position to give this information. The responses of those who did provide this information indicated that more than half of them (53 per cent) knew of at least one instance in which free services were offered to a client, and 21 per cent were aware of four or more incidents of this kind (see Table 13). Violations of other types were less often reported. Nonetheless, half of the respondents knew of at least one action within the past two years which involved competition on charges and one which involved public criticism of another architect. On the other hand, more than half of the respondents knew of no profit-sharing agreements or cases of failure to encourage young architects to become registered during this time period.

Minnesota graduates appeared to be particularly aware of incidents involving public criticism of professional colleagues; two-thirds of them reported knowledge of actions of this type, compared with 32 per cent of the men who were graduates of other schools. Minnesota men also reported observing violations of the "free services" rule more frequently than did graduates of other schools.

The most recently licensed architects reported knowledge of violations of the "free services" and "competition in charges" rules more often than did the groups registered earlier. They also reported a larger number of known violations of these two types than did the men registered in earlier years. Two-thirds of the men registered in the 1950's, for example, knew of violations of the "free services" rule and 12 reported knowing of 10 or more such violations. Less than one-third of the men registered before 1940, and about half of those registered in the 1940's, reported violations of this type. The percentages of the registration year groups who reported

Table 13: KNOWLEDGE OF VIOLATIONS OF MANDATORY RULES OF PRACTICE DURING PAST TWO YEARS

Violation	Percentage of Total Group (N=272)			
	Reporting No Occurrences	Reporting 1-3 Occurrences	Reporting 4 or More Occurrences	Giving No Response
An architect offered free services to a prospective client as an inducement to employment	25	32	21	22
An architect knowingly competed with another architect on the basis of professional charges	28	35	14	23
An architect entered into a profit-sharing agreement with a contractor or firm connected with the building industry	55	18	4	23
An architect publicly criticized the work of a fellow-architect who is currently employed for the purpose of completing this work	26	49	2	23
An architect failed to encourage and train young men in his employ to become registered	60	9	5	26

actions involving competition in charges were similar. On the other hand, the men registered most recently less often reported knowledge of actions involving three other rules of practice -- those concerning profit sharing agreements, criticism of the work of another architect, and failure to encourage young architects to become licensed.

Comments on Ethical Practice Rules

Several of the architects supplemented their responses regarding occurrences of specific violations of the rules of architectural practice with comments indicating a need for review of the present rules. For example, one man who knew of several violations of the rule concerning free services to prospective clients said that:

"There are a number of evasions of the intent of this rule by offering surveys, sketches, etc. at nominal prices," and added that, "I hear of architects taking low commissions; knowingly or not, price competition is fairly common. I do not know yet in my own mind if it is wrong or not to solicit work on such a grand scale as some firms seem to do; maybe it is necessary. I do not know."

The restriction of profit-sharing agreements was not acceptable to some, including one man who said that there is a "serious question regarding the 'rightness' of this provision." Similarly another argued that "the 'package' deal should be either stopped or legalized."

The section of the questionnaire devoted to ethical violations aroused a few skeptical comments about the value of the information collected:

"Why is this question included? The violations are gossip generally and answers will be of little value. They will be emotionally answered, if at all."

"These problems are largely the results of the unwillingness of certain men to commit themselves to what is right. Perhaps a stronger attempt should be made to avoid giving registration to men who, though competent, may not be of high principles."

Some respondents were doubtful about the likelihood of any improvements in the present situation:

"As an architect engaged in the contracting business for 20 years, I believe I know more about the above violations than architects do, but we do not talk, and the American Institute is never going to correct the situation."

"The above listed rules are basically ridiculous because too many of the persons acknowledging them lack any real sense of values -- they regard the rules as personal protection in a society of socially ambitious, backslapping, self-appointed big wheels who damage by implication and trust almost no one ... the mandatory rules are petty -- they don't guarantee good architects or even assume to -- they are self-protective in lieu of expressing trust based on fact or even hope."

"The A. I. A. places a great deal of emphasis on their 'code of ethics,' which in my opinion is violated mostly by its own members."

"Question is irrelevant to the view of past performance of governing authorities and their failure to take punitive action where violations are known."

Although, as the previous comments show, some of the respondents claimed that members of the American Institute of Architects were the most frequent violators of the rules, others disagreed:

"Cases of known violation were primarily by firms whose principals are not A. I. A. members and who have not been required to take architecture exams -- 'grandfather clause.' "

"Some of worst work is by 'grandfather law' registrants."

"Most reports of violation seem to involve non-registered men or those not in A. I. A. "

Specific criticisms were made of architects who use a salaried position to compete. One person said that "many architects are concerned with the activity of college professors aggressively competing with private architects. We believe the conscientious professor will keep his private practice within reasonable limits."

Through many of the comments ran the theme that if architects wish to be regarded as professional men, they must pay much more attention to their standards of practice:

"It appears too often that architecture is a business rather than a profession."

"I believe that the leading offices and especially those connected with the School of Architecture should set a high standard of practice with clients, between themselves, with consultants, and in the eyes of the general public. We have failed miserably."

"As a young practitioner, I am very disappointed with the ethics and integrity of some of our older colleagues."

"The profession locally, and to a less extent nationally, is in the state of the medical profession 20 years ago. The current code of ethics is a farce if 95 per cent of the offices give lip service only and some offices of the A. I. A. are among the worst violators. The profession is creating its own problems by unprofessional conduct and lack of solidarity. Strong leadership and good public relations program would help. The latter is needed for public understanding and knowledge of good professional work."

CHAPTER VI

SUMMARY AND CONCLUSIONS

At the request of the University of Minnesota School of Architecture and the Minnesota Society of Architects, the practicing architects of Minnesota were asked to participate in an appraisal of architectural education. Although primarily concerned with academic training in architecture, the scope of the study also included related professional problems involving registration examinations and rules of practice. An advisory committee composed of members of the Minneapolis Chapter of the American Institute of Architects cooperated in planning the study and in the collection of data.

A questionnaire developed specifically for this study was sent to all registered architects practicing in Minnesota and in the upper midwest area. A reply of some type was received from 71 per cent of the 430 architects in the defined group, and usable questionnaires were returned by 63 per cent. Background information on the training and experience of the architects participating in the study was obtained to describe the group providing the data and to identify subgroups based on the architectural school attended and the date when registration as a licensed architect was received.

Who Were the Respondents ?

The responding architects were drawn largely from residents of the state of Minnesota, particularly the Twin Cities area. Most of these architects were associated with architectural firms, but a number were in independent practice or employed by non-architectural firms or agencies.

Men who had received at least one degree from the University of Minnesota comprised 53 per cent of the respondents, and 42 per cent had received all of their degrees from this institution. The men who were entirely Minnesota trained were usually relatively recent graduates of the School of Architecture who held Bachelor of Architecture degrees. Many of them had become registered as licensed architects during the 1950's and held positions in architectural firms. In contrast, the men who had received all of their training elsewhere were more apt to hold a Bachelor of Science or Bachelor of Engineering Degree. They also tended to be an older group who had been registered as licensed architects for a longer period than the Minnesota graduates.

The present activities of the men educated in different types of institutions did not differ greatly in relative emphasis; but the men registered at earlier dates, who naturally had had more experience as architects, were more apt to be in management positions than the men registered more recently. The latter group appeared to be relatively more concerned with design activities than were individuals with longer experience.

How Did the Respondents Appraise Academic Training in Architecture?

The architects were asked to appraise several aspects of their own academic training in architecture and also to evaluate current preparation of students for work as architects-in-training. The points covered in the broad appraisals of their own academic training included both professional and cultural aspects of the architectural program.

In general the quality of teaching in architecture courses was rated as "good;" although half of the men thought that it might be improved if instructors were given some professional training in principles of learning, testing, and teaching methodology. The academic programs were also regarded as "good" or "very good" preparation for the state registration examination by the majority of respondents and especially so by the men who had more recently prepared for them.

The most frequent criticisms of architectural academic training concerned the lack of sufficient emphasis on practical applications and field work and the lack of opportunity for work in the humanities and social sciences which would enrich the architect's cultural background. Minnesota graduates and men registered as architects during the last 10 years were most critical in these respects. Minnesota trained men were also more inclined than those trained elsewhere to regard their architecture courses as "too general" in their coverage of important topics.

The admission requirements and the length of the architectural programs completed by the respondents were typically regarded as "about right," but those who differed in opinion usually described the admission requirements as "not restrictive enough" and the length of the program as "too short." Minnesota men were no more critical than others of admission requirements but more often said that their training program had been "too short."

While slightly more than a third of the architects thought that recent graduates of the School of Architecture had the qualifications they expected of an architect-in-training, nearly as many were uncertain, or negative in their reactions. When asked to select which of several types of architectural education programs would provide the most effective training for architectural students, the largest proportion of the respondents chose a six-year program leading to the degrees of Bachelor of Arts and Bachelor of Architecture. A third of the group, however, preferred the Bachelor of Architecture with engineering emphasis, a five-year program. Preference for the combined six-year degree program was particularly notable among the Minnesota-trained architects and among the men who had become registered architects most recently. A majority of the respondents also indicated that they would favor a revision in the present program of the School of Architecture which would provide some type of program for students who lacked design ability. Specific suggestions were made as to the kinds of programs which might be offered.

How Did the Respondents Appraise Specific Courses?

A rather clear and consistent picture of strengths and weaknesses in the courses offered in the field of architecture appeared when these were judged for their adequacy as preparation for architectural practice. Courses in Architectural Design were typically rated quite highly by the majority of the respondents. To a lesser extent this was true of courses in Structure and the History of Architecture. Courses which appear to have been least adequate in the judgment of the respondents were those in Professional Relations and Administration, followed by those in Building Construction and Technology.

Minnesota graduates were more often impressed favorably with the preparation received in their Design courses than were graduates of other schools, but were more often critical of their courses in Professional Relations and Administration and in Building Construction and Technology. Men registered as architects most recently also gave a larger proportion of favorable ratings to their Design courses and there was a decided increase in the proportion of favorable ratings of Site Planning courses among the men who became registered during the 1950's as compared with those registered earlier.

Ratings of adequacy of course preparation for the registration examinations for architects were, on the whole, much the same as those for professional practice. Sizeable proportions of the respondents rated their examination preparation in Architectural Design, Structure, and History of Architecture as "good" or "very good," while the Professional Relations and Administration examination preparation received a large share of unfavorable ratings. Men trained at the University of Minnesota and, in general, those who had become registered most recently were most often satisfied with their preparation in Architectural Design and Structure, whereas ratings of preparation for the History of Architecture and the Site Planning examinations tended to vary more with the individual, some rating it as "good" and others as "poor." Preparation for the Professional Relations and Administration examination, on the other hand, was typically rated as no better than "fair."

How Well Were Specific Course Objectives Achieved?

To permit a more accurate pinpointing of the particular strengths and weaknesses of courses that were generally rated favorably or unfavorably in the broad appraisals, a more detailed analysis of attainment of specific objectives of four of the architecture courses was made. The courses considered were Architectural Design, History of Architecture, Building Construction and Technology, and Professional Relations and Administration. With the exception of a few areas involving detailed factual knowledge, the respondents generally agreed that the objectives of these architectural courses dealt with important aspects of architecture. They varied considerably though in the extent to which they believed they had personally achieved these objectives.

One goal of the Architectural Design courses which almost everyone agreed to be important, the understanding of principles of arrangement of buildings and elements within buildings, was reported as well achieved by a larger proportion of the respondents than any other course objective. The understanding of principles of structural organization and those involved in site planning, as well as the ability to achieve proper balance between the functional and aesthetic aspects of design were also reported as well achieved by a sizeable proportion of the respondents, although less often by the men trained at Minnesota. Some of the more practical aspects of Design courses involving health and safety standards and mechanical requirements appeared to be less well achieved by any of the groups.

Comparison of the reported level of achievement of History of Architecture course objectives and their rated importance demonstrated that these were not necessarily related. The objective most often achieved was knowledge of great periods and ability to recognize their characteristics, but less than half of the group regarded this as important. Other objectives which a third or more of the group thought that they had achieved well were the ability to evaluate architectural design, understanding of the influence of natural forces on architectural design, and the ability to organize and present ideas effectively, all of which were judged to be of importance. Among the objectives of history courses regarded as important by more than half of the group, the one least often attained was recognition of the necessity to develop an architectural philosophy or ideology. Minnesota-trained men differed most from the rest in their ratings of achievement of their ability to organize and present ideas effectively, which notably fewer of them felt they had achieved well. While the men who were registered for the longest time were most apt to believe they had acquired a knowledge of great periods and ability to recognize their characteristics in their history courses, those registered more recently more often thought they had developed the ability to evaluate architectural design.

The courses in Building Construction and Technology had the most extensive list of objectives of any course, but only eight of the 14 mentioned were regarded as important by the majority of the respondents. The objectives judged to be important were those involving general knowledge of construction details and management problems and the ability to apply such knowledge to practical problems rather than knowledge of specific construction details. The objective most often achieved well was the knowledge of structural systems and design, but this by only 42 per cent of the group. Other objectives reported as achieved well by 30 to 40 per cent included the ability to apply knowledge to practical problems and knowledge of general construction details. Certain of the objectives regarded as important by a majority of the respondents, including knowledge of specifications and of supervision were, on the other hand, reported as "not achieved at all" or "achieved to a minor extent only" by a majority of the respondents. A consistently smaller percentage of the Minnesota-trained men reported achievement of the

construction and technical objectives than did the men trained in other institutions. This difference was particularly notable with respect to knowledge of structural systems and design and knowledge of general construction details. Men who were registered in the 1950's also were more critical of their attainments in this field than were those registered earlier. This was particularly so with respect to the ability to apply knowledge to practical problems.

Courses in Professional Administration and Relations have been consistently identified in the general course appraisals as one of the weakest aspects of the architectural educational program in the opinion of the responding architects. The objectives of these courses were, however, regarded as important by a large proportion of these men. Less than a third of the architects thought that they had attained any of the objectives beyond a simply adequate level, but knowledge of the architect's administrative, supervisory, and legal responsibilities appeared to be the weakest aspect of these courses. Minnesota trained men did not differ from those trained elsewhere with respect to their achievement of the objectives of these courses, and differences among the groups registered in different decades were not great, although those more recently registered appeared to feel that they had achieved these goals least well.

How Were the Registration Examinations Rated?

The respondents were asked to provide judgments and comments on two professional problems of architects, the examinations for registration as a licensed architect and mandatory rules of practice. Most of the architects thought that registration examinations were fair tests of knowledge of really important subject matter in the fields covered and Structure and Architectural Design examinations were rated as good or very good tests by the majority. Examinations in Site Planning, History of Architecture, and Professional Relations and Administration received the largest number of unfavorable ratings. On the whole, the registration examinations were regarded as "better" tests of the subject matter covered than were course examinations in the same fields. Architectural Design and History of Architecture course examinations were exceptions in this respect.

Minnesota graduates tended to be more favorably impressed with the Structure, Architectural Design, and Site Planning registration examinations than graduates of other schools. Men registered most recently generally gave more favorable ratings to all of the examinations than men who have been registered for more than 10 or 20 years, but they were more inclined to criticize the History of Architecture examination than were those registered before 1950. They were less critical, however, of the Site Planning examination.

A number of suggestions for improving the registration examinations were offered. Some of these referred to the material tested in specific examinations, particularly the History of Architecture, Building Construction, and Design examinations. In general, the recommendation was made that the examinations be designed to test understanding of principles and relations rather than the recall of specific facts, dates, places, or formulae. Suggestions as to ways in which the Design examination could be improved included advance announcement of the kind of building to be designed, less emphasis on drawing skill, and better criteria for the judging of design problems. Other comments dealt with broader questions of examination policy such as whether there is any need for the examinations at all, the forms of test that should be used, and examination board procedures. While the comments tended to be critical, a number of respondents took the opportunity to indicate that they thought that the registration examinations had improved in recent years.

What Was Known About Violations of Rules of Practice?

In an attempt to estimate the frequency of certain violations of mandatory rules of practice of the American Institute of Architects as well as attitudes about such actions, the architects were asked to indicate how often they had known of occurrences of certain types of actions in violation of these rules and to add comments if they wished. Offering free services to a client, competition in charges, and public criticism of another architect were the violations most frequently reported. Most of the architects knew of at least one occurrence of each of these types of actions. Profit-sharing agreements or failures to encourage young men to become registered were less frequently reported.

Minnesota graduates were particularly aware of incidents involving criticism of professional colleagues and violations of the free services rule. While men registered in the 1950's had most often noted violations of the free services and competition in charges rules. Comments on the ethical practices violations by the responding architects indicated that a number thought that the present rules should be reviewed, particularly those with regard to solicitation of work and profit sharing agreements.

Some respondents questioned whether information about ethical violations should be collected as part of the study, regarding it as of little value. Others were doubtful about the likelihood of any improvement in the present enforcement of rules. Perhaps the most pervasive theme was that architects as a professional group needed to pay much more attention to their standards of practice.

Conclusions and Related Recommendations

1. In appraising their own academic training in architecture, the men now practicing in Minnesota generally felt that they had been well prepared for their work as architectural designers but less well prepared for the professional relations and administrative aspects of architectural practice. Preparation in engineering aspects was typically judged to be only fair. Graduates of the University of Minnesota were particularly inclined to stress their strong preparation in design, but relative weakness in the engineering and professional relations and administration areas.
2. While the architects thus usually rated their preparation for the practical problems of architectural practice as weak, they were divided as to how the situation should be remedied. The majority recommended more emphasis on practical applications and field work as part of academic training, but some thought that Schools of Architecture should emphasize theoretical background and leave the practical aspects to be learned in an architectural office. Recommendations for more emphasis on practical applications and field work included these:

"The architectural student should be more aware of what is required to produce a building when he leaves school. The knowledge of what type of work background he will have to obtain (preponderance of detail work, somewhat tedious at times) before he can proceed to a responsible design position would make for a more satisfactory mental adjustment from the school of atmosphere to the business of architecture."

"The 'installation' of a 'Professional Attitude' and pride toward same -- toward the A.I.A. The 'What and Why' of a set of bid documents. A closer duplication of 'school' drawings and specifications to actual office practice."

"Training should include preparing the graduate to make public presentation to large or small groups either to sell his solution or design and to establish confidence in his ability. Greater emphasis on structural problems and knowledge of materials to properly interpret the design at hand."

"Problems or programs in which the architectural student is the co-ordinator of architectural design with structural, mechanical, and electrical designs by students from these departments. More emphasis on the legal significance of working drawings and specifications as contract documents."

"More lectures by practicing architects in the details of practice to acquaint the students with the actual office conditions with which they will have to cope -- so they will not be disappointed or disillusioned."

But not all agreed:

"Because of its complexity, architecture cannot be completely taught in five years. Emphasis should therefore be upon providing a nucleus for student to build in practice."

"Feel that schools should concentrate on architectural design and structural design with minimum of office practice subjects which can be learned in architectural offices."

3. The apparent need for more emphasis on the engineering aspects of architectural training also led to two types of proposals. One was that a better balance should be sought between the design and engineering elements of architectural training; while a second, not necessarily opposed opinion was that the architectural program should provide for specialization in either the design or engineering phases.

Recommendations for more emphasis on engineering involved:

"Better balance between design subjects and engineering courses. More attention to practical construction problems. Instruction in good drafting techniques."

"Strong instructors and courses in technology. Perhaps a longer course (six years?). An integration of technology and design courses. A recognition of the urgent need for able administrators and technicians. Good men may be discouraged because they lack design ability. They should be allowed to finish with perhaps more activity in technology."

"Architecture is becoming more and more specialized and complex. Day of the master architect is dead. There is need for many talents and areas of specialization in well-rounded office. Student should be given opportunity to select and develop his own talents. At Minnesota you are a designer or you're nothing."

"Recognize that not all students are not cut out to be designers -- aesthetics -- only, but try to make course more flexible -- say at end of second year. Evaluate as to a student's long suit and help to develop this learning with sufficient emphasis to well-rounding."

4. While Design courses generally received highly favorable ratings, some would suggest that more stress be placed on the theory of design:

"Academic programs should develop even more conclusively the principles of design in a greater number and variety of conditions. Other courses should be simplified to concentrate study on those experiences one is most likely to encounter."

"Place more stress on the theory of design. There are too many fads in Architectural Design today."

"I regret the apparent teaching of 'style' in the school of architecture today. I believe the development of 'little Mies,' 'little Wrights,' etc. should be carefully avoided."

"Avoid unlimited use of free imagination. Put across the demand that all structures are not merely to satisfy dreams of design grandeur -- they must fulfill basic needs for original reasonable cost, reasonable maintenance, satisfactory fulfillment at function and be reasonably pleasing. Not based on presently accepted clichés."

5. The limited amount of time which could be given to work in fields outside architecture during their own academic training was regretted by some of the architects who recommended that a stronger cultural base be required in the architectural program. Some thought this should be done if necessary by eliminating some of the technical courses:

"The ceiling on an architect's achievement is rarely a technical deficiency. It is far more apt to be an over-emphasis on technique at the expense of not knowing where his architecture and his efforts fit into the general culture. While college or even a life-time is probably inadequate to produce a really cultured person, the architects who seem to have gone high are those who can best relate themselves to the total cultural environment in which they function. In short, more general background courses if possible at the expense of plumbing."

"Emphasize cultural subjects, including design -- History and art -- Add, or at least suggest, cultural electives -- De-emphasize the measures of engineering -- Basic familiarity, not superiority is adequate -- Much more emphasis on business administration, economics, law -- Today's architect is not a true architect -- He is (by force, not choice) -- an administrator -- By proper preparation he may be able to revert to being an architect!"

6. Minnesota graduates and men registered as licensed architects during the last 10 years favored six-year architecture programs providing a stronger cultural base for professional training.

"Longer time must be spent in general cultural courses and thus the time spent leading up to a B. Arch. degree must be lengthened. Maybe six years instead of five. Train the young architect to think of himself as a working member of society and get across to him that his designs are related to the culture of the society he finds around himself."

"Would suggest that an SLA Degree, or equivalent experience, be required before a person becomes a candidate for the Professional Architectural Degree."

"I strongly suggest emphasis on Cultural Subjects in addition to the requirement for architecture so that the School develops the full man rather than Architectural specialists. Philosophy strongly recommended."

7. The present registration examination program for license as an architect was generally regarded as a "fair" one, particularly by men who have taken the examinations most recently, but there appeared to be room for improvement in those examinations which now involve considerable amount of detailed information and in the conduct of the design and other examinations.
8. Violations of certain of the mandatory rules of practice of the American Institute of Architects were known by the majority of the respondents. Some of them questioned whether certain of the rules should exist. A need for review of the present rules and of the education of the profession in regard to them was frequent in the suggestions.

APPENDIX A

Questionnaire Used in Study

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Bureau of Institutional Research

University of Minnesota

EVALUATION OF ARCHITECTURAL EDUCATION AND REGISTRATION
sponsored by the

University of Minnesota School of Architecture
and the
Minnesota Society of the American Institute of Architects

The purpose of this questionnaire is (1) to determine how you would evaluate your professional training (either at the University of Minnesota or elsewhere) in terms of the extent to which it prepared you adequately for the practice of your profession; and (2) to elicit your opinions regarding existing registration procedures. Your thoughtful responses are essential to the continued evaluation and improvement of architectural education and registration in Minnesota.

Section I. Biographical Data

In this section you are asked to provide information about your experience and training.

A. Age (A 4,5)

B. Present position (describe briefly) _____

_____ (6)

C. In what year were you registered as a licensed architect _____. (If architect-in-training please check _____.) RR (7,8)

D. Experience: Please describe the type of experience you have had since graduation or registration by indicating what percentage of your time has been spent, both as a licensed architect and an architect-in-training, in each of the following phases of work. Please be sure that the percentages you insert in each column total 100 per cent.

<u>Kind of Work</u>	<u>Percentage of time as Architect-in-Training</u>	<u>Percentage of time as Licensed Architect</u>
Client contacts	____ (9,10)	____ (23,24)
Business management	_____	_____
Design	_____	_____
Working drawings	_____	_____
Specifications	_____	_____
Supervision	_____	_____
Other (please specify)	____ (21,22)	____ (35,36)
Total	100 %	100 %

E. Please list chronologically each college degree received. If none, please check here _____. R (38)

<u>College or University</u>	<u>Degree</u>	<u>Year Conferred</u>
_____	_____	_____
_____	_____	_____
_____ (37)	_____ (38)	_____ (39,40)

Section II. Objectives of Academic Architectural Program

Listed below in the center of the page are a number of possible objectives or aims of architectural courses. Please read and follow the directions given directly above the columns to the right and to the left of the objectives listed.

In this column please indicate the extent to which you feel you achieved each objective in the architectural courses you took. Circle the number which most closely represents your answer, according to the following numerical code:

- 5 -- Extremely well achieved
- 4 -- Well achieved
- 3 -- Adequately achieved
- 2 -- Achieved to a minor extent
- 1 -- Not achieved at all

In this column please rate each objective in terms of its importance in architectural courses. Circle the number which most closely represents your opinion, according to the following numerical code:

- 5 -- Very important
- 4 -- Important
- 3 -- Of some importance
- 2 -- Of little importance
- 1 -- Of no importance

Extent of Achievement in Architectural Courses						Objective	Importance as a Course Objective					
						<u>History of Architecture</u>						
(B11)	5	4	3	2	1	Development of understanding of cultural, religious, political, economic, and technological forces which have contributed to architecture.	5	4	3	2	1	(B4a)
	5	4	3	2	1	Knowledge of great periods and ability to recognize their characteristics	5	4	3	2	1	
	5	4	3	2	1	Ability to apply knowledge of history to present practical design problems	5	4	3	2	1	
	5	4	3	2	1	Recognition of the necessity to develop an architectural philosophy or ideology	5	4	3	2	1	
	5	4	3	2	1	Ability to organize and present ideas effectively	5	4	3	2	1	
	5	4	3	2	1	Understanding of the influence of climate, geography, land contours, available materials, etc., on architectural design	5	4	3	2	1	
	5	4	3	2	1	Ability to evaluate architectural design	5	4	3	2	1	
	5	4	3	2	1	Knowledge of location, dates, periods, etc., of specific structures	5	4	3	2	1	
						<u>Professional Administration and Relations</u>						
	5	4	3	2	1	Knowledge of proper relationships among architect, owner, and contractor	5	4	3	2	1	
	5	4	3	2	1	Knowledge of the architect's: Administrative responsibilities	5	4	3	2	1	
	5	4	3	2	1	Supervisory responsibilities	5	4	3	2	1	
	5	4	3	2	1	Legal responsibilities	5	4	3	2	1	
	5	4	3	2	1	Responsibility to the profession	5	4	3	2	1	

Extent of Achievement
in Architectural Courses

Objective

Importance as a
Course Objective

Architectural Design

(4)

5	4	3	2	1	Understanding of principles of arrangement of buildings and elements within buildings
5	4	3	2	1	Understanding of basic standards for health and safety
5	4	3	2	1	Understanding of principles of structural organization
5	4	3	2	1	Ability to achieve proper balance between functional and aesthetic aspects of design
5	4	3	2	1	Ability to present ideas graphically
5	4	3	2	1	Understanding of basic principles of mechanical requirements
5	4	3	2	1	Understanding of principles involved in orientation and utilization of building sites
5	4	3	2	1	Recognition of necessity to develop an architectural philosophy or ideology

5	4	3	2	1
5	4	3	2	1
5	4	3	2	1
5	4	3	2	1
5	4	3	2	1
5	4	3	2	1
5	4	3	2	1
5	4	3	2	1

(59)

Building Construction and Technology

5	4	3	2	1	Ability to apply knowledge to practical problems
5	4	3	2	1	Knowledge of:
5	4	3	2	1	Structural systems and design
5	4	3	2	1	General construction details
5	4	3	2	1	Finish materials and details
5	4	3	2	1	Cost estimating
5	4	3	2	1	Specifications
5	4	3	2	1	Supervision
5	4	3	2	1	Plumbing equipment and installation
5	4	3	2	1	Heating equipment and installation
5	4	3	2	1	Fire protection equipment and installation
5	4	3	2	1	Ventilation and air conditioning equipment and installation
5	4	3	2	1	Vertical circulation equipment and installation
5	4	3	2	1	Electrical equipment and installation
5	4	3	2	1	Acoustical considerations

5	4	3	2	1
5	4	3	2	1
5	4	3	2	1
5	4	3	2	1
5	4	3	2	1
5	4	3	2	1
5	4	3	2	1
5	4	3	2	1
5	4	3	2	1
5	4	3	2	1
5	4	3	2	1
5	4	3	2	1
5	4	3	2	1
5	4	3	2	1
5	4	3	2	1

(50)

(45)

Section III. Evaluation of Your Academic Training in Architecture

A. In this section you are asked to evaluate your academic training in terms of the extent to which it prepared you adequately for your profession. In each of the items circle the number which most nearly represents your opinion.

1. The time required to complete the professional architectural program was

(41)

1	2	3	4	5
Too Short		About Right		Too Long

2. Compared with the emphasis put on theory in the professional program, practical applications and field work received

1	2	3	4	5
Too Little Emphasis		About the Right Emphasis		Too Much Emphasis

3. In terms of preparation for the state registration examinations the professional academic training was, in general,

1	2	3	4	5
Very Poor	Poor	Fair	Good	Very Good

4. In terms of adequate coverage of important topics, courses in the professional architectural program were

1	2	3	4	5
Too general--not thorough enough		Well-balanced between general and specific		Too specific--not broad enough coverage

5. In general, the quality of teaching in the professional program was

1	2	3	4	5
Very Poor	Poor	Fair	Good	Very Good

6. Requirements for admission to the School of Architecture professional program were

1	2	3	4	5
Too restrictive--many able students excluded		About Right		Not restrictive enough--many unqualified students admitted

7. In terms of the extent to which it provided an adequate general cultural background the School of Architecture program was

(47)

1	2	3	4	5
Very Poor	Poor	Fair	Good	Very Good

B.1. (Column A is to be answered only by architects registered through Minnesota registration examinations)

Please rate, by circling the appropriate number in Column A, each of the architectural courses listed below in terms of the extent to which it prepared you adequately for your registration examinations. Please rate, by circling the appropriate number in Column B, each course in terms of the extent to which it prepared you adequately for your professional practice. Use the following numerical code to mark your answer:

- 5 -- Very Good
4 -- Good
3 -- Fair
2 -- Poor
1 -- Very Poor

Course	A. Preparation for Registration Examinations					B. Preparation for Architectural Practice					
	5	4	3	2	1	5	4	3	2	1	
History of Architecture	5	4	3	2	1	5	4	3	2	1	(148)
Structure	5	4	3	2	1	5	4	3	2	1	
Building Technology	5	4	3	2	1	5	4	3	2	1	
Site Planning	5	4	3	2	1	5	4	3	2	1	①
Architectural Design	5	4	3	2	1	5	4	3	2	1	
Building Construction	5	4	3	2	1	5	4	3	2	1	
Professional Relations and Administration	5	4	3	2	1	5	4	3	2	1	(54)

B.2. Please rate your registration examinations and the School of Architecture course examinations which you took, in terms of the extent to which they tested your knowledge of really important subject matter in the course areas listed below. Rate the registration examinations in Column A and the course examinations in Column B by circling the number in each column which most closely represents your answer according to the following numerical code:

- 5 -- Very Good
4 -- Good
3 -- Fair
2 -- Poor
1 -- Very Poor

Type of Course or Examination Section	A. Quality of Registration Examinations					B. Quality of Course Examinations					
History of Architecture	5	4	3	2	1	5	4	3	2	1	(55)
Structure	5	4	3	2	1	5	4	3	2	1	
Building Technology	5	4	3	2	1	5	4	3	2	1	
Site Planning	5	4	3	2	1	5	4	3	2	1	
Architectural Design	5	4	3	2	1	5	4	3	2	1	
Building Construction	5	4	3	2	1	5	4	3	2	1	
Professional Relations and Administration	5	4	3	2	1	5	4	3	2	1	(61)

C. Please list those aspects, either general or specific, of your own architectural academic training which you feel were either quite strong or very weak in terms of the adequacy with which you were prepared for the practice of your profession.

1. Strong points

(A62)

2. Weak points

(63)

D. Please suggest improvements which you believe should be made in the program of academic architectural education.

(64)

E. Please suggest improvements which you believe should be made in registration examinations and procedures.

(65)

Section IV. Policies in Architectural Education and Practice

A. Please place a check (✓) in the blank space to the left of the one pattern of architectural education which you believe provides the most effective training of architectural students. (The suggested total length of each program is given in parentheses.)

- 1 ☐ Field training (no formal academic training)
- 2 ☐ Bachelor of Arts with major in Architecture (4 years)
- 3 ☐ Bachelor of Architecture with engineering emphasis (5 years)
- 4 ☐ Bachelor of Arts and Bachelor of Architecture (6 years)
- 5 ☐ Non-professional undergraduate degree prerequisite to 3 or 4 year professional program (7-8 years)
- 6 ☐ Other (please specify) _____
(166)

B. Listed below are certain actions of practicing architects which represent violations of the mandatory rules of practice of the American Institute of Architects. Please indicate how often, to your personal knowledge, each violation has occurred in Minnesota during the past two years. In each case place a check (✓) in the box in the column at the right which represents your answer according to the scale at the head of the column.

<u>Violation of Mandatory Rules</u>	Number of occurrences in past two years					
	<u>None</u>	<u>1-3</u>	<u>4-6</u>	<u>7-9</u>	<u>10 or more</u>	
An architect offered free services to a prospective client as an inducement to employment	☐	☐	☐	☐	☐	(167)
An architect knowingly competed with another architect on the basis of professional charges	☐	☐	☐	☐	☐	
An architect entered into a profit-sharing agreement with a contractor or firm connected with the building industry	☐	☐	☐	☐	☐	
An architect publicly criticized the work of a fellow-architect who is currently employed for the purpose of completing this work	☐	☐	☐	☐	☐	
An architect failed to encourage and train young men in his employ to become registered	☐	☐	☐	☐	☐	(71)
Comments or explanatory remarks	0	1	2	3	4	

- C. 1. Do you believe that some type of program should be available within the School of Architecture for able students who cannot succeed in the existing architectural curriculum because they lack design ability? Please check (✓).

Yes 1 No 2 Uncertain 3
(172)

If yes, what type of program would you suggest?

2. Do you believe that teachers of architecture should have training designed to acquaint them generally with principles of learning, testing, and teaching methodology? Please check (✓).

Yes 1 No 2 Uncertain 3
(79)

If yes, please explain.

3. Do you feel that recent graduates of the School of Architecture have had the qualifications you expected of an architect-in-training? Please check (✓).

Yes 1 No 2 Uncertain 3
(74)

If no, please list the areas in which you feel they have been deficient.

Thank you for your fine cooperation!

Please return to:

Bureau of Institutional Research
University of Minnesota

330 Burton Hall
Minneapolis 14, Minnesota

APPENDIX B

Supplementary Tables for Chapter IV

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Table A-1: PERCENTAGE OF RESPONDENTS GIVING VARIOUS RATINGS OF THE IMPORTANCE OF ARCHITECTURAL DESIGN COURSE OBJECTIVES

Objective	Percentage of Total Group (N=272) Rating Course Objective as:					
	Very Important	Important	Of Some Importance	Of Little Importance	Of No Importance	No Response
Understanding of principles of arrangement of buildings and elements within buildings	75	18	2	--	--	5
Understanding of principles of structural organization	45	46	4	--	--	5
Ability to achieve proper balance between functional and aesthetic aspects of design	56	33	4	--	1	6
Understanding of principles involved in orientation and utilization of building sites	46	42	7	--	--	5
Ability to present ideas graphically	41	46	9	--	--	4
Understanding of basic standards for health and safety	32	46	15	1	1	5
Understanding of basic principles of mechanical requirements	19	56	18	2	--	5
Recognition of necessity to develop an architectural philosophy or ideology	36	29	20	7	3	5

Table A-2: PERCENTAGE OF RESPONDENTS GIVING VARIOUS RATINGS
OF THE IMPORTANCE OF HISTORY OF ARCHITECTURE
COURSE OBJECTIVES

Objective	Percentage of Total Group (N=272) Rating Course Objective as:					
	Very Important	Important	Of Some Importance	Of Little Importance	Of No Importance	No Response
Ability to evaluate architectural design	52	33	7	1	1	6
Understanding of the influence of climate, geography, land contours, available materials, etc., on architectural design	54	28	11	2	--	5
Ability to organize and present ideas effectively	49	25	12	5	3	6
Development of understanding of cultural, religious, political, economic, and technological forces which have contributed to architecture	30	42	18	3	1	6
Recognition of the necessity to develop an architectural philosophy or ideology	36	25	20	11	2	6
Knowledge of great periods and ability to recognize their characteristics	10	33	43	8	1	5
Ability to apply knowledge of history to present practical design problems	12	29	35	13	5	6
Knowledge of location, dates, periods, etc., of specific structures	3	9	46	30	7	5

Table A-3: PERCENTAGE OF RESPONDENTS GIVING VARIOUS RATINGS OF THE IMPORTANCE OF BUILDING CONSTRUCTION AND TECHNOLOGY COURSE OBJECTIVES

Objective	Percentage of Total Group (N=272) Rating Course Objective as:					
	Very Important	Important	Of Some Importance	Of Little Importance	Of No Importance	No Response
Ability to apply knowledge to practical problems	58	29	6	1	--	6
Knowledge of structural systems and design	42	45	8	--	--	5
Knowledge of general construction details	34	44	16	1	--	5
Knowledge of finish materials and details	31	41	18	5	--	5
Knowledge of acoustical considerations	15	49	28	2	1	5
Knowledge of specifications	25	37	25	8	--	5
Knowledge of supervision	22	37	27	7	2	5
Knowledge of cost estimating	16	39	28	10	2	5
Knowledge of ventilation and air conditioning equipment and installation	8	41	37	7	2	5
Knowledge of heating equipment and installation	7	41	39	7	2	4
Knowledge of plumbing equipment and installation	7	41	38	8	1	5
Knowledge of electrical equipment and installation	8	38	40	8	2	4
Knowledge of fire protection equipment and installation	8	36	38	10	3	5
Knowledge of vertical circulation equipment and installation	7	34	38	13	3	5

Table A-4: PERCENTAGE OF RESPONDENTS GIVING VARIOUS RATINGS
OF THE IMPORTANCE OF PROFESSIONAL ADMINISTRATION
AND RELATIONS COURSE OBJECTIVES

Objective	Percentage of Total Group (N=272) Rating Course Objective as:					
	Very Important	Important	Of Some Importance	Of Little Importance	Of No Importance	No Response
Knowledge of proper relationships among architect, owner, and contractor	54	32	7	1	--	6
Knowledge of the architect's administrative responsibilities	40	39	12	2	--	7
Knowledge of the architect's supervisory responsibilities	42	37	12	1	1	7
Knowledge of the architect's legal responsibilities	40	37	16	1	--	6
Knowledge of the architect's responsibility to the profession	39	37	16	2	--	6

Table A-5: PERCENTAGE OF RESPONDENTS REPORTING VARIOUS LEVELS OF ACHIEVEMENT OF ARCHITECTURAL DESIGN COURSE OBJECTIVES

Objective	Percentage of Total Group (N=272) Reporting Course Objective as:					
	Extremely Well-Achieved	Well-Achieved	Adequately Achieved	Achieved to a Minor Extent	Not Achieved At All	No Response
Understanding of principles of arrangement of buildings and elements within buildings	24	44	20	5	--	7
Understanding of principles of structural organization	13	31	34	11	3	8
Ability to achieve proper balance between functional and aesthetic aspects of design	13	30	34	12	1	10
Understanding of principles involved in orientation and utilization of building sites	14	23	34	18	2	9
Ability to present ideas graphically	13	35	33	10	1	8
Understanding of basic standards for health and safety	4	21	41	20	6	8
Understanding of basic principles of mechanical requirements	4	16	32	33	7	8
Recognition of necessity to develop an architectural philosophy or ideology	9	18	32	22	11	8

Table A-6: PERCENTAGE OF RESPONDENTS REPORTING VARIOUS LEVELS OF ACHIEVEMENT OF HISTORY OF ARCHITECTURE COURSE OBJECTIVES

Objective	Percentage of Total Group (N=272) Reporting Course Objective as:					
	Extremely Well-Achieved	Well-Achieved	Adequately Achieved	Achieved to a Minor Extent	Not Achieved At All	No Response
Ability to evaluate architectural design	11	27	37	14	3	8
Understanding of the influence of climate, geography, land contours, available materials, etc., on architectural design	13	28	30	19	2	8
Ability to organize and present ideas effectively	8	25	30	18	10	9
Development of understanding of cultural, religious, political, economic, and technological forces which have contributed to architecture	9	20	37	27	1	6
Recognition of the necessity to develop an architectural philosophy or ideology	7	18	28	28	12	7
Knowledge of great periods and ability to recognize their characteristics	11	32	35	15	--	7
Ability to apply knowledge of history to present practical design problems	5	13	35	33	7	7
Knowledge of location, dates, periods, etc., of specific structures	4	16	39	28	5	8

Table A-7: PERCENTAGE OF RESPONDENTS REPORTING VARIOUS LEVELS OF ACHIEVEMENT OF BUILDING CONSTRUCTION AND TECHNOLOGY COURSE OBJECTIVES

Objective	Percentage of Total Group (N=272) Reporting Course Objective as:					
	Extremely Well-Achieved	Well-Achieved	Adequately Achieved	Achieved to a Minor Extent	Not Achieved At All	No Response
Ability to apply knowledge to practical problems	11	26	35	17	3	8
Knowledge of structural systems and design	7	35	35	14	2	7
Knowledge of general construction details	7	23	34	26	3	7
Knowledge of finish materials and details	3	15	36	32	5	9
Knowledge of acoustical considerations	3	7	19	34	29	8
Knowledge of specifications	2	4	14	35	37	8
Knowledge of supervision	4	6	11	28	44	7
Knowledge of cost estimating	1	7	9	29	46	8
Knowledge of ventilation and air conditioning equipment and installation	1	8	26	42	16	7
Knowledge of heating equipment and installation	1	9	30	41	12	7
Knowledge of plumbing equipment and installation	1	9	30	41	12	7
Knowledge of electrical equipment and installation	2	3	29	43	16	7
Knowledge of fire protection equipment and installation	1	5	22	35	29	8
Knowledge of vertical circulation equipment and installation	1	5	19	39	27	9

Table A-8: PERCENTAGE OF RESPONDENTS REPORTING VARIOUS LEVELS OF ACHIEVEMENT OF PROFESSIONAL ADMINISTRATION AND RELATIONS COURSE OBJECTIVES

Objective	Percentage of Total Group (N=272) Reporting Course Objective as:					
	Extremely Well-Achieved	Well-Achieved	Adequately Achieved	Achieved to a Minor Extent	Not Achieved At All	No Response
Knowledge of proper relationships among architect, owner, and contractor	11	19	22	31	9	8
Knowledge of the architect's administrative responsibilities	6	9	25	39	13	8
Knowledge of the architect's supervisory responsibilities	6	12	24	36	13	9
Knowledge of the architect's legal responsibilities	4	7	23	38	19	9
Knowledge of the architect's responsibility to the profession	9	19	28	27	8	9